# 1999 Congress on Recreation and Resource Capacity

# **Book of Abstracts**

Susan Scott Lundquist and Glenn E. Haas, Compilers

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# **Carrying Capacity Justification**

The image of saying "no" to outdoor recreationists who wish to pursue a favorite outdoor recreation activity on public lands or waters is not a pleasant thought, largely because the outdoor recreation profession has little to agree upon in dealing with this complex issue. Yet, perhaps the most universal agreement seems to be the intuitive belief, and oft begrudging admittance, that there is a point or threshold to the number of visitors to public outdoor recreation settings after which sustainability of the wide range of social and economic benefits from these settings begins to diminish. Increasing outdoor recreation demand in America, coupled with increasing international tourism, makes it imperative that the nation's outdoor recreation profession prepares itself to address the issue of capacities in public outdoor recreation settings.

How we deal with the issue of human capacity is one of the greatest challenges facing our use of public land and waters as we enter the 21st century. We need to address such dimensions as 1) the fundamental moral dilemmas associated with the exclusion of the public from any public resource, and the "preservation versus use/man versus nature" debate, 2) basic theoretical and definitional differences, 3) insufficient social and biophysical scientific advancement, 4) lack of information exchange across the spectrum of local, state, federal and private sector providers of outdoor recreation opportunities, 5) questions about the efficacy of existing alternative capacity planning and management strategies, 6) the recreating publics willingness to forego a level of spontaneity and freedom to assure a higher quality experience and resources, 7) economic impacts to local communities and private entrepreneurs, and 8) the expanding policy formulation role by our political and judicial systems.

Some efforts are underway. Public agencies have begun to address the capacity question under the rubric of reservation systems, limited license and permits systems, visitation limits on length of visits and party size, fee systems, mass transportation systems, facility design capacities, persons-at-one-time capacities, size limits on fish and wildlife game species, restrictions on sport harvesting methods, designated backcountry campsites, policies and regulations defining inappropriate uses, land and water-based zoning systems, limits on the size and speed of boats and recreational vehicles, limits of number of visitors on interpretive walks, and many other manifestations of capacity systems.

The justifications for such initiatives seem to vary in credibility and public acceptance. Capacity systems based on the notion of public health and safety considerations or infrastructure design capacity seem to be less contentious and defensible. Greater controversy surrounds capacities based on protection of the natural and cultural resources, provision of quality outdoor recreation experiences, and an agency's enabling legislation.

The issue of recreation capacities is germane to all our Nation's public lands and waters and to every local, state and federal agency and private sector provider of outdoor recreation opportunities. Important decisions will continue to be made that will affect our natural and cultural resources, the visiting publics, private entrepreneurs and local communities, and the opportunity of our future generation to use and enjoy our Nation's great outdoors.

It is imperative that the nation's outdoor recreation profession prepares itself to address the issue of capacities in public outdoor recreation settings.

# **Congress Planning Team**

A draft congress prospectus was shared among major state and federal agencies and environmental organizations in order to assess the merit and support for a national congress on visitor capacities in outdoor recreation settings. The response was very gratifying. We want to recognize the following individuals that have helped shape the 1999 Congress on Recreation and Resource Capacity.

Laura Loomis - National Parks and Conservation Association Fran Mainella - National Association of State Park Directors Glen Alexander - National Association of State Park Directors Tim Merriman - National Association for Interpretation Rodger Schmitt- National Society for Park Resources/Bureau of Land Management Vernon Lovejoy - Bureau of Reclamation Jack Welch - Blue Ribbon Coalition Chris Monz - National Outdoor Leadership School Craig Mackey - Outward Bound Scootch Pankonin - America Outdoors Jerry Mallett - The Adventure Travel Society Susan Kirkpatrick - National Audubon Society - Colorado Office Gordon Kimball - National Association of Recreation Resource Planners Deborah Shields - US Forest Service--Rocky Mountain Experiment Station Dan Williams - US Forest Service - Rocky Mountain Research Station Jerry Stokes - US Forest Service--Division of Recreation, Heritage and Wilderness Resources Sheri Fetherman - US Fish and Wildlife Service Marilyn Hof - National Park Service Garv Machlis - National Park Service -- Social Science Program James Falk - National Sea Grant Office Don Bruns - Bureau of Land Management John Smeltzer - Colorado Division of Wildlife Len Carpenter - The Wildlife Management Institute Laurie Matthews/Joe Maurier - Colorado Division of Parks and Outdoor Recreation Rick Perdue - University of Colorado--Center for Sustainable Tourism Glenn Haas - Colorado State University Mike Manfredo - Colorado State University Jerry Vaske - Colorado State University Pat Slavik - America Honda Motor Corporation

Emily Daniels - Tread Lightly

# **Congress Sponsors**

\*National Parks and Conservation Association National Association of State Park Directors National Association of Interpretation National Society for Park Resources \*Bureau of Reclamation \*BlueRibbon Coalition \*America Honda Motor Corporation \*National Outdoor Leadership School **Outward Bound** America Outdoors Colorado Wild, Inc. Tread Lightly The Adventure Travel Society National Audubon Society - Colorado Office National Association of Recreation Resource Planners **\*US Forest Service - Rocky Mountain Experiment Station** \*US Forest Service - Division of Recreation, Heritage and Wilderness Resources \*National Park Service - Social Science Program **\*US Fish and Wildlife Service** US Army Corps of Engineers National Sea Grant Office \*Bureau of Land Management \*Colorado Division of Wildlife The Wildlife Management Institute Colorado Division of Parks and Outdoor Recreation University of Colorado - Center for Sustainable Tourism Colorado State University - Human Dimensions in Natural Resources Unit

\*A special thanks and recognition for the Congress leadership gifts provided by these organizations.

# **A Working Definition and Process Model**

The concept of carrying capacity has been evolving over the last 50 years. So too has our understanding of where capacity decisions fit into management decision-making. The following definition and production process model are offered to serve as working tools and a common point of departure for the Congress.

# **Carrying Capacity:** a prescribed number and type of people *(demand)*, that an area will accommodate *(supply)*, given the desired biophysical/cultural resources, visitor experiences, and management program.

The words were chosen carefully---

"a prescribed number" - this acknowledges the reasoned decision by a person of authority rather than some absolute or formula-based decision,

"type of people" - capacity decisions must be inclusive beyond recreation use and consider all human uses and values for an area, and must also clearly and comprehensively define what people are demanding (i.e., activities, settings, and experiences),

"demand" - recognizes the importance of consumer preference in public resource decisions,

"that an area will accommodate" - implies that only a portion of the demand will be provided for, and also implies that use of public resources is a privilege and not a right,

"supply" - recognizes that agencies produce or provide services, products and values to publics,

"given" - acknowledges the existence of conditions and/or constraints by which public demand will be supplied in a given area,

"biophysical/cultural resources, visitor experiences, and management program" - recognizes the need to be comprehensive, integrative, concurrent, and holistic in decision-making.

Dr. Glenn Haas September 1, 1999

# The Outdoor Recreation Production Process (Not Available on pdf file)

# **Abstracts for Concurrent Sessions**

The interest in the topic of Carrying Capacity is reflected in the numerous and diverse abstracts submitted for the Congress. This book contains those unabridged abstracts and will hopefully serve as an educational and networking resource for the years ahead.

The compendium Congress Program details the schedule for the entire congress.

## **Opening Reception**

# **Comparative Analysis of Outdoor Recreation Capacity Programs Among Local, State and Federal Agencies**

Keith M. Brown Masters of Science Candidate Colorado State University

#### **Glenn E. Haas** Professor Colorado State University

While the concept of recreational carrying capacity has been thoroughly discussed, rarely have public land managers been surveyed about the formulation of capacities and the implementation of capacity systems. The purpose of this project was to develop a database of 100 examples of capacity systems currently administered by local, state, and federal public land managers across the United States. Private and international examples were also included. Selection of study participants emphasized diversity in regard to regulated activities, agency type, and geographic location. One-hour telephone interviews were conducted with managers, generating quantitative and qualitative data. Each interview involved a series of questions emphasizing the capacity planning and decision-making stage, and the capacity implementation stage. Qualitative responses allowed managers to comment on what they had learned and how they would improve the process. Preliminary results from a comparative analysis of the database will be helpful to managers in the administration of their own capacity programs. Additionally, a capacity website will be introduced, making this information available as a resource for managers in the future.

Panel Sessions on Wednesday, December 1, 1999

8:00 a.m. - 10:00 a.m.

#### Panel: Boating Capacity Management Plans: Successful Case Studies

#### **Chris Foreman**

Park Manager Highline Lake State Park Colorado Division of Parks

During the summer of 1994 Highline Lake State Park staff became concerned about the consistent complaint that the lake was too crowded with boats. Although this was not new, complaints about too many boats on the small lake have been around since the lake was constructed for recreation in 1969, it was apparent that something had changed. The increased presence of Jetskis (personal watercraft or PWCs) seemed to be the catalyst.

The existing boating capacity of 40 vessels has been in place for over (20) years and has served as a realistic upper limit of use until the recent increase of personal watercraft (PWC) use elevated the boat accident rates over the normal low rate of 2-3 per year to 10-11/yr.

A concentrated effort to monitor the boating use on the popular water sports oriented state park was undertaken during the summer of 1996 to document the situation. Data was collected by boat patrol during periods of boat capacity, "snapshots" of lake activity were collected and actual counts of vessels engaged in activities were made.

Staff researched the varying methods that several parks had used to establish boating carrying capacity. It became very apparent that the methods for determining the capacity is a very individual situation and differed markedly from park to park. The essence of the existing information on boat capacity was that there is no formula that works for all the many varied waters that have vessel use. The method advocated was to use local conditions and site specific management mechanisms in combination with input from local users to solve capacity issues.

#### Alan R. Graefe

Professor Penn State University

#### Jim Holland

Lake Mead National Recreation Area

Abstract Title: Establishing Boating Capacities at Lake Mead National Recreation Area.

This paper describes the process followed to develop a lake management plan for boating at Lake Mead National Recreation Area. The process was based on a

series of integrated surveys that established a baseline inventory of physical, biological, and social factors affecting the quality of recreation at the lake. Use levels were monitored through a combination of aerial overflights and ground counts of parked vehicles and empty marina slips at developed areas. Visitor survey data were integrated with other data sources to estimate boating carrying capacities for 24 distinct zones (9 zones on Lake Mohave and 15 zones on Lake Mead). The zoning scheme segmented the lakes according to five distinct types of experiences to be provided (Primitive, Semi-primitive, Rural Natural, Urban Natural, Urban Park). Standards were defined for the limiting factors of safety, shoreline accessibility and social carrying capacity based on previous precedents and data analysis. The lowest value among the three factors for the designated experience type was selected as the most limiting factor. This process was repeated for each zone for several planning alternatives, resulting in a matrix of zone capacity alternatives. Finally, the relationship between facility use and zone use was estimated from boaters' reports of where they spent the most time boating. The percentage of boaters from a given facility using each zone was multiplied by the estimated number of boaters using that facility, and summated across all facilities to predict the total number of boats per zone under varying conditions. Results show that the typical conditions observed on summer weekends are consistent with the standards for all zones on Lake Mead and Lake Mohave. Peak use conditions are near capacity levels for selected zones on Lake Mead and above capacity for one zone on Lake Mohave. Decisions about future management and facility development will be based on the predicted impacts of the proposed actions on the various lake zones.

#### Bob Toll

Assistant Park Manager Cherry Creek State Park 4201 South Parker Road Aurora, Colorado 80014

Cherry Creek State Park is Colorado's first State Park. The park is located in the Cherry Creek watershed of the Denver Metropolitan area. The watershed is home to two of the fastest growing counties in the United States, Arapahoe and Douglas Counties.

The park is within a twenty-minute drive of nearly 2 million people. The park hosts 1.5million visitors annually. The majority of summer visitors engage in water based recreation.

The 880-acre lake is zoned for a wide range of recreational activities to include swimming and boating. Boating includes both motorized and non-motorized experiences. The park instituted boat capacity controls in

the 1970's for public safety, resource protection and user experience reasons. Boat waiting lines are common from mid May through mid September on most summer weekends. Lines begin to form at 7 am and a 3-hour wait to launch is not uncommon.

Criteria for boat capacity controls include vehicle parking spaces, normal recreational mix, marina activity, use patterns and conflicts, average lake conditions, and general standards for acres necessary to engage in boating activities.

The capacity program requires most of park staff to implement effectively. On a busy summer weekend park staff are either vilified or praised when controls are implemented. A boater's perspective can change depending on whether they are waiting in a line or on the water!

#### Michael Walker

Rationing Coordinator Arkansas Headwaters Recreation Area (AHRA)

Resource protection, public safety, or administration -- whatever the reason or reasons for creation of a rationing plan and/or allocation system <u>success</u> will be measured by compliance. Involving the public and concessionaires in the building or creation of the rationing plan instills a sense ownership. Participants become selfgoverning and active in the growth of a plan. Keeping a rationing plan dynamic allows for free-flowing ideas and creative brainstorming during the life plan. Resource managers can focus on monitoring and enforcing conditions -- participants can focus working within the guidelines.

The model of public and concessionaire involvement in the creation of a dynamic plan is the AHRA Rationing Plan for commercial boating. The AHRA has the largest number of commercial rafting outfitters in the country - 63, and the largest number of commercial boaters over 300,000 each summer. The Rationing Plan for commercial boating divides the Arkansas River (148 river miles from Leadville, Colorado to Lake Pueblo) into 12 management sections with differing capacities on each section. The Rationing Plan is creative and complex, not complicated. Compliance is excellent due in large part to the involvement of ALL outfitters in the creation of the Rationing Plan from the beginning. After all 63+ heads are better than one!

#### Panel: Carrying Capacity and the Right to Roam: International Differences in Public Access to Nature

#### **Professor Nigel Curry**

Head of the Countryside and Community Research Unit Cheltenham and Gloucester College of Higher Education Francis Close Hall Swindon Road, Cheltenham, Glos GL50 4AZ, UK

Abstract Title: Changing Access Rights in Britain - the Challenge for Management

There is a wide range of complex access mechanisms in Britain based on historical precedent, public policy and market provision. Supply-led policies on the part of both the state and diversifying landowners have led to a considerable increase in the available resource during the 1990s. Aggregate consumption, however, has been static for the past 20 years and is consistently skewed towards the more affluent. Questions are raised therefore about the propriety of further public expenditure on access in terms of both efficiency and equity. In this climate proposed legislation for access to open country in England and Wales and all land in Scotland are assessed in the context of British land rights traditions. To a degree, the shifting supplydemand balance in access provision is likely to reduce pressures on land and diminish the need for the management of carrying capacity. In this regard, traditional state policies are compared with the potential of markets to resolve carrying capacity issues, both in terms of administrative costs and consumer satisfactions.

#### Bjørn Kaltenborn

Norwegian Institute for Nature Research Lillehammer Norway

#### Klas Sandell

Associate Professor Department of Physical Education and Health Örebro University and Environmental History Department of Historical Studies Umeå University

Abstract Title: The Scandinavian Tradition of Public Right to Access

The public right of access to the countryside – which means that everyone has the right, within certain restrictions, to move freely across private land and water, pick mushrooms, flowers and berries, stay overnight etc. – is a basic element in the tradition of Nordic outdoor recreation. Mainly discussing Norway and Sweden (a similar situation is to be found in Finland) we could note the roots in premodern society, later on to some extent bolstered by legislation.

In Norway there is a special law centered around the difference between the earlier village commons vs. the fields and meadows (also in the premodern society privately owned). The current right of public access is linked to outdoor recreation and important elements are freedom, responsibility, and the fact that it is the landscape as such in terms of visibility, vulnerability and local contexts that to a large extent tells you what is allowed or not. Current discussions deals with e.g.: international integration, a less homogenous society, commercialism and new outdoor activities. Accessibility is an important aspect of the social creation of the meaning of landscape and the Scandinavian tradition of public right of access could be seen as such a meaning. Therefore, this tradition involves important aspects with bearing on e.g. environmental education, cultural identity, quality of life and tourism.

#### Stephen F. McCool

School of Forestry The University of Montana Missoula, MT 59812

#### **George Stankey**

Pacific Northwest Research Station USDA Forest Service Corvallis, OR

Abstract Title: Managing Access to Wilderness Resources: An American Perspective

Managers of wilderness and other similar resources have been confronted with the enormous challenge of resolving two overlapping, but also competing objectives: protecting the pristine character of the area while allowing recreationists access to it. Research has shown that any level of recreational use leads to some level of biophysical and social impact, so managers must decide, if recreationists are permitted access, how much impact is acceptable. Traditionally, dilemma has been described as the recreational carrying capacity problem: how many people are too many? However, research has also shown that the relationship between visitation levels and impacts is mediated by a large number of variables, many of which are outside the purview of manipulation by managers. Attempts at limiting impact by limiting visitation levels (or by managing access to the resource) fail if any number of visitors larger than a minimum is permitted access. This failure is a result of a serious miscasting of the problem of managing impact and recreational access. The problem is one of defining acceptable amounts of change in natural conditions (given recreational access) and managing not to exceed that level of change. The problem is one of defining

which of two conflicting goals are ultimately constraining management and limiting degradation from that goal. The recreational carrying capacity paradigm also fails in that a number of conceptual and practical conditions needed to identify and implement a capacity figure cannot be met in most situations. Given these limitations, what alternatives avail themselves to managers? This is a particular pernicious situations given reductions in institutional capacity to manage recreation in wilderness. Better understanding and framing the specific problem is the foundation upon which resolutions will be based. Examining the problem within a regional context is also important. Given the values at stake and their distribution among the population of wilderness and backcountry users, processes that are inclusive are more likely to identify appropriate responses.

#### Dr. Norman McIntyre

Department of Leisure Studies University of Waikato Hamilton, New Zealand

#### **Dr. John Jenkins**

Department of Leisure and Tourism Studies University of Newcastle Newcastle, Australia.

#### Ms. Kay Booth

Department of Human and Leisure Sciences Lincoln University Canterbury, New Zealand

Abstract Title: Recreational Access to Countryside in Australia and New Zealand

Historically, Australia and New Zealand have had a strong connection in property and land rights traditions and law with the United Kingdom. Landholder rights are therefore closely guarded and take precedence over public rights of access to land. For this reason, the majority of outdoor recreational activity takes place on public land and in coastal areas. While public access to shorelines is enshrined in legislation, access to inland lakes and rivers is more complex and contested. Populations in both countries are relatively small in comparison to the UK and USA, but are concentrated in urban and near urban areas which are sited principally on the coast. As a consequence, concentration of recreational demand combined with the often conflicting land-use by industry, agriculture, tourism and associated infrastructures create enormous pressures and conflicts on land in the urban fringes, especially in national parks, and on adjacent shorelines.

While near urban areas are a focus of concern for activists and governments alike, rural areas are not devoid of access conflicts between landowners, with strong views on trespass, and urban visitors, who are, at times, careless or ignorant of appropriate behaviors and countryside codes. Rural depopulation and declining rural incomes combined with a growth in economic rationalist philosophy have created an increasing emphasis on user pays for recreational access to public and private lands and waters. Greater consciousness in relation to the traditional land rights of indigenous peoples is increasingly being reflected in land ownership and legislation, with important implications for recreational access. This paper has two aims. First it reviews the historical basis of property rights in Australia and New Zealand. Secondly, it explores the responses of landowners, public agencies and visitors both to public recreational access, and to key social and economic changes which are affecting countryside access for recreation.

#### Panel: Carrying Capacity and the Use of Snowmobiles and Personal Watercraft in the National Parks

#### **Kevin Collins**

National Parks and Conservation Association

Abstract Title: A Determination of Appropriate Recreation in Our National Parks or "Why Jet Skis Just Don't Belong"

Much of the criticism of jet skis, snowmobiles, and similar motorized recreational vehicles centers on the damage they do to the physical resources of our public lands. For example, the visible scars from ORV use make it easy for many people to conclude that off-road vehicles are not "appropriate" in protected natural areas such as national parks. People also are very sensitive to the degradation of perceptual resources such as natural quiet.

At the same time, an activity may be relatively benign in terms of resource damage, but still not "appropriate" for a certain area. In these cases, the resources at risk are often relatively abstract but no less important to the integrity of the area. Determination of appropriateness, however, becomes more difficult to articulate as an activity's quantifiable level of resource damage decreases, especially for non-motorized activities. This presentation will address some of the factors that should be used to determine the level of "appropriateness" of a particular activity.

Jet skis are an instructive example of the "appropriateness" question because their fundamental design and intended use as high-speed thrillcraft make them inappropriate for use in the National Park System. Other activities are less clear cut, however. Whitewater kayaking, for example, does not directly pollute water resources and its impact on other resources can be mitigated through appropriate regulation. Nevertheless, a request to open portions of Yellowstone National Park to kayaking has met with considerable resistance, including from the National Parks and Conservation Association.

In developing regulations to control park uses, the Park Service has largely considered measurable resource impacts. What the Park Service has not adequately addressed is the much less obvious question of "appropriateness." At the heart of this question is determining what type of experience we want to promote at a park and whether a particular use would conflict with that experience.

#### Ed Klim

International Snowmobile Manufacturers Association

Abstract Title: Highlights of Who Snowmobilers Are

1. Highlight the Safety Programs available for safety training for snowmobilers.

2. Demographic information regarding the snowmobile industry in North America.

3. Review and discuss emissions findings as a direct result of current testing using the new ISMA testing cycle for snowmobile engines.

A. Review current SAE and ISO testing standards for snowmobile exhaust emissions.

B. Findings of other current tests that have been performed on engine emission levels and snowmobile use factors.

#### Sean Smith

Master's of Science Conservation Director Bluewater Network

In 1872, Yellowstone became the world's first National Park. It was created for the benefit and the enjoyment of the American people. Forty-four years later, Congress passed the Organic Act, which mandated that present enjoyment must leave park resources "unimpaired for the enjoyment of future generations." By passing the Organic Act, Congress declared that forms of recreation which cause permanent damage to park resources are inappropriate for the National Park System. At that time, tens of thousands of people visited the National Parks and motorized recreation was almost non-existent.

Today, over 250 million people visit the parks annually. Many of these visitors want to use motorized forms of recreation such as snowmobiles, off-road vehicles, and jet skis. The National Park Service has recognized that the increased use of jet skis, snowmobiles, and off-road vehicles degrades the environment and the NPS has created regulations for these vehicles. However, they still remain a severe threat to the health and vitality of the National Park System. The continuing use of recreational vehicles in our National Parks comes at too high a price in the form of degraded wilderness, increased conflicts with other recreation users, toxic water pollution, noise disturbances, harassed and injured wildlife, and increased accidents. The battle to determine the appropriateness of jet skis, snowmobiles, and off-road vehicles is part of a much larger management struggle over what type of vision will determine the future of national parks like Yellowstone, Glacier and the Everglades. Will that vision be characterized by the drive for increased corporate profit margins, shortterm motives, and local bias, or will it be a vision based on conservation values, long-term goals, and national interests?

#### **Panel: Hunter Capacities**

**Diane Gansauer** Executive Director Colorado Wildlife Federation

Abstract Title: Why Hunters Want to Limit Their Numbers, and What They Can Expect When They Try

Colorado Wildlife Federation is comprised of wildlife conservationists of all interests, predominantly including hunters and anglers.

In 1997, CWF endorsed a citizens' petition to limit bull elk licenses in game units 66 and 67 through a drawing process. The ratio of mature male to female elk in these units was among the lowest in Colorado. The goals were to improve herd composition, achieve population objectives by shifting the harvest from bulls to cows, and provide a less crowded hunting experience.

Controlling the number of hunters is a powerful tool for managing game populations and improving the experience of those in the field. Economies dependent on a healthy herd also benefit in the long-run.

The Commission's decision agreed with the petition to limit bull licenses, but was overturned in court by a group of outfitters. The court found that the Commission had not given sufficient public notice of the change. The Commission renewed their decision in 1999, and was again sued by the same group. CWF defended the decision. This time the Commission's decision was upheld. Resistance to license limitations came primarily from those whose income would be impacted, and secondarily from hunters who wanted a guarantee of being able to hunt an area annually.

Preliminary results of limitations have been encouraging -- for improving herd composition and reaching population objectives, and for improving hunters' experiences. Short-term economic impacts as a whole were less than expected. Monitoring of wildlife and economic impacts should continue.

Growing impacts on wildlife necessitate controlling and directing harvest. Support for using license limitations to direct harvest is evident. Citizens in the Gunnison basin have recently asked that licenses be limited in their area -- one of the most popular hunting areas in the state.

#### **Cynthia Pierce**

Human Dimension Unit Colorado State University Fort Collins, Colorado 80523

#### Michael J. Manfredo

Department Head Colorado State University Fort Collins, Colorado 80523

#### Peter J. Fix

Human Dimensions Unit Colorado State University Fort Collins, Colorado 80523

Abstract Title: A Planning System for Addressing Capacity Issues in Hunting Recreation

Decisions regarding the provision of wildlife recreation opportunities require consideration of factors affecting the possible capacity for the activity. Hunting recreation capacity is determined by factors such as the herd and resource capabilities, the types of hunting opportunities and associated tolerance for other hunters, issues of hunter safety with increasing numbers of hunters in the field, landowner acceptability for various herd sizes on their lands, and other societal factors. We propose an approach for planning for hunting recreation that determines the social and resource factors affecting hunting capacity. These factors are integrated into a system which balances capacity concerns while striving to provide the opportunities that are most desired by hunters.

We applied this approach to planning for elk and deer hunting opportunities in Colorado. In early 1999, Colorado State University's Human Dimensions in Natural Resources Unit and the Colorado Division of Wildlife began identifying and considering the factors affecting hunting capacity. Efforts were primarily focused on resource capabilities and hunter opportunities. This included an inventory of herd populations and resource capabilities in the state. Ideally, this is accompanied by an inventory of the existing hunting opportunities that are provided. Based upon this baseline information, alternative statewide allocation of resources and recreation are considered. For each scenario, it is important to identify issues of acceptable numbers of hunters in the field, land owner tolerance for herd sizes, economic impacts, consideration of safety, and other factors which influence hunter capacity. We developed three alternatives, in addition to considering the present situation. Next, an assessment was conducted of hunters' demand for different hunting opportunities and their preferences for the resource allocation scenarios. This information was used to develop statewide policies for balanced resource allocations. As part of the next step, a policy for recreation should follow. After establishing resource and recreation policies, standards are created to indicate whether objectives are being met and capacities are at acceptable levels. We describe how this process is evolving from efforts in Colorado.

#### Panel: Perspectives from National Park Service Superintendents

Chas Cartwright Superintentendent Devils Tower National Monument

Abstract Title: The Tower is Full!

Devils Tower National Monument, this country's first National Monument, provides trail based recreational opportunities over a 1347-acre rural setting. Since the last General Management Plan (GMP) in the mid-1980's, visitation to the park has doubled from 200,000 to 400,000 people per year. Although visitation has remained fairly stable during the 1990's, the high level of use during a relatively short primary visitor season has adversely affected the quality of the visitor experience, especially in regards to congestion along the main park road, at available parking areas, and along the primary trail. In addition to inadequate and deteriorating transportation related infrastructure, the park does not possess an adequate visitor orientation and education facility, which further impacts the quality of the

visitor experience. The high level of visitation has also affected resource conditions, albeit to a lesser degree than by the proliferation of noxious plants and the removal of fire from the ecosystem.

The park is now undertaking a new GMP using a land-based zoning system known as Visitor Experience Resource Protection (VERP). This GMP will focus more on the "what" (what kind of visitor experience and resource conditions should the park be managing for) than previous plans that concentrated more on the "how". Even given this focus on defining desired conditions, considerable attention will be paid to developing prescriptive solutions for the park's congestion problem. An alternative transportation system will be one of several potential solutions considered during the environmental analysis process, along with a reservation system, visitor number restrictions, and other manifestations of capacity based systems. In order to adequately assess transportation related alternatives, additional information is needed on vehicle counts, types, and sizes during the primary and shoulder seasons, as well as on the number of people in vehicles. The park also needs to assess visitor attitudes about various transportation and circulation strategies. The intent in applying circulation modeling to transportation and visitor carrying capacity issues is to develop a comprehensive range of visitor use management options.

#### Professor Ignazio Camarda

President of National Park Via dei Mille, 3 07024 – La Maddalena, SS – Italy

Abstract Title: The National Park of Archipelago of La Maddalena

The La Maddalena Archipelago is the first National Park in Sardinia. It was founded in January 1994 and its management staff started working on June 1998.

The Archipelago covers about 12,000 hectacres in Northern East of the Sardinia Island, in the Mediterranean Sea. It includes seven main islands and several smaller ones, all of them under the jurisdiction of the La Maddalena City Council, including the surrounding marine areas. This is the reason why La Maddalena Archipelago is considered a true geo-marine park.

According to the Italian laws regarding National Parks, the Archipelago was divided in two macro-zones (terrestrial and marine). The first one includes three subareas and the second one two sub-areas. In each one, new regulations of protection have been enacted. The La Maddalena Archipelago has the most important colony of *Laurus audinii* in the entire Mediterranean area and also holds a lot of nesting sites of *Hydrobates pelagicus*. Reptiles like *Lacerta bedriagae* (black lizard) also characterize this area.

Landscape and sea of the Archipelago are considered among the most beautiful of the world. For this reason, every year in the summer, more than 6,000 motor and sailing boats are present in the region, attracted also by a famous tourism site called Costa Smeralda.

#### Park Aims

The National Park must assure the participation of the local community for the development of the Park, as ell as for the fulfillment of environmental, historical and cultural resources. While the Park takes into account the local lifestyle and the traditional activities, it also follows these primary objectives:

- Defense, valorization, utilization of natural and historical resources through the establishment of suitable itineraries;
- Increase in value and retraining of rural activities;
- Restoring natural vegetation;
- Preserve the wilderness and biodiversity inside the small islands
- Develop sustainable activities in the Park such as traditional shipbuilding and fishing;
- Planning and restoration of historical buildings;
- Tourism and bathing services;
- Use of clean energy;
- Development of exchanges among parks of different regions of the world.

#### Activities

In the summer of 1999, new rules were applied for the first time inside the Archipelago. Among the most important ones there were the rules regarding the marine zones, traditional fishing, underwater and sport-fishing, diving, recreation and marine traffic, total protection of the areas of nidification of protected marine birds. Furthermore, the main public shores were delineated with ropes, while the 300-meter limit from the coast with buoys. An island, the famous Spiaggia Rosa (rose-beach) has been closed to the public, thus forbidding baths and transit. More than 22,000 authorizations were given for boats and several hundred of thousand passengers visited the islands. A course for 52 National Park guides was also established. The guides, after receiving training, shared their new techniques with the public.

Moreover, the restoration of the ancient buildings was initiated to create the Center of Environmental Education for the public and for the students. During this period, several cultural initiatives were started involving many schools of different countries of Italy and Europe.

# **Panel: User Conflicts in River and Lake Environments**

Anneliese Grieve Instructor School of Applied Geography Ryerson Polytechnic University

Abstract Title: A Case Study for Stakeholder Involvement in Establishing Recreational Carrying Capacity for the Georgian Bay Region (Lake Huron)

The Georgian Bay region is known for the largest island archipelago in the Great Lakes (the "Thirty Thousand Islands"), and for its rugged and picturesque Canadian Shield terrain. The rich mosaics of landscape and waterscape combined with the inaccessibility of much of the area serves to support and protect a considerable range of biodiversity including some significant species. The region's natural resource base is its key attraction for recreational use.

The Georgian Bay region is largely a recreational area supporting small permanent communities, larger seasonal communities, and several first nation communities. Recreational activities supported by the region include: cottaging, camping, boating, sea kayaking, snowmobiling, cross country skiing, hiking, canoeing, fishing, hunting, sailing, birdwatching, and wildlife observation. The region is also home to one national park, and several provincial parks. Georgian Bay is recognized as one of the best cruising areas in the world and is renowned for its muskellunge fishing. Finally, the southern end of the Georgian Bay region is within a two hour drive of the City of Toronto; the largest urban area in Canada. The proximity to Toronto has historically and is continuing to draw considerable recreational use to the region.

This region is currently under pressure from development and recreational use. Conflict between different recreational user groups is already occurring and is expected to increase as recreational use increases.

Furthermore, the frequency and intensity of recreational use are impacting the unique ecosystems of the region. In order to develop an understanding of the complex issues facing this region and possible solutions to these issues, a collaborative decision-making approach is being used to develop a regional ecological and economic development plan. An important part of this planning exercise is establishing recreational carrying capacity.

Presently, there is no recreational or ecological plan for the region as a whole, and as such development occurs on an ad hoc basis with little consideration of impacts to the entire ecological and recreational system. In an attempt to control development and manage the demand for recreational use, this regional planning exercise is currently being undertaken. The ultimate goal of this planning is to manage the ecological and economic health of the whole region in a manner which protects the significant ecological features while permitting a wide variety of recreational uses. It is understood that long-term economic development for this region will focus on ecotourism and outdoor recreation.

#### Don Hunger

Student Conservation Association 1265 S. Main Street, #210 Seattle, WA 98144-2009

Abstract Title: Commercial and Private Boat Use on the Salmon River in the Frank Church River of No Return Wilderness, Idaho

The management plans for the Middle Fork and Main Stem of the Salmon River are undergoing revision to ensure that current and future generations will enjoy a primitive and pristine float boat experience, with opportunities for solitude and unconfined recreation. In the past ten years, float boat use has increased more than 20 percent on both rivers. Conflicts among different types of recreation boating have occurred, from commercial and private parties vying for campsites on the Main Stem, to extended periods within sight and sound of other parties on the Middle Fork. Visitor use has also impacted many campsites, damaged streamside vegetation and tarnished historical pictographs.

This study determined that on both rivers, private boaters have more than twice the previous experience of commercial boaters, although their expectations are similar for many indicators of their experience.

They expected being in sight of other parties for less than one hour per day, did not expect to be delayed at rapids by other groups, expected to see one-to-two modern human structures per day, and expected to see one-to-two low-flying aircraft per day. Visitor expectations were not met on every day of their trip. Their experiences become unacceptable when their expectations are exceeded by almost double what they anticipated. For example, Middle Fork boaters expected to see fewer than two low-flying aircraft per day, but reported seeing 4.6 to 7 low-flying aircraft per day as unacceptable.

The primary motivation for visitors coming to these rivers is "perceiving naturalness." The most important indicators are signs of prior human activity, including improperly disposed human waste, litter and human tree damage. The top problem reported by floating visitors is the intrusion of motorized transportation to access the wilderness. On the Middle Fork, boaters ranked low-flying aircraft as the top problem. On the Main Stem, boaters ranked jet boats as the top problem.

#### Sandra Mitchell

Executive Director Hells Canyon Alliance

#### Arthur Seamans

Staff Assistant Hells Canyon Alliance

Abstract Title: The Snake River in Hells Canyon: A Case Study of How Not to Determine Carrying Capacity

Powerboating in the HCNRA dates from 1865 and sternwheelers. The Corps of Engineers began blasting rocks to improve navigation in 1903. Gasoline powered boats arrived in 1910. Jetboats dominated in the 1960's; floating exploded during the 1970's.

A years-long fight over dams culminated with the 1975 HCNRA Act. A 1981 Forest Service plan, contrary to Congressional intent and local tradition, severely restricted powerboats and excluded them from part of the canyon. Appeals overturned the plan; an ensuing plan had no motorized limits.

In 1988 the agency started planning again, using the Limits of Acceptable Change (LAC) process. User perceptions were studied and a representative task force selected. University of Idaho staff facilitated 19 meetings; a plan emerged in 1991.

The Forest Service delayed that plan's EIS more than a year. The ID team largely ignored the two-year LAC effort, assuming incompatibility between floating and powerboating. Their 1993 DEIS proposed alternating weeks of exclusive float and powerboat use, something no one wanted.

The 1994 FEIS gave exclusive use of the canyon's heart to floaters 21 days each summer and slashed powerboat access. That plan's social objectives were unsupported; there were no resource issues. The HCNRA Act's history and intent weren't analyzed.

The battle continues, in appeals and in court. The government spent more than a million dollars developing a plan the public hates; the public has spent nearly that amount fighting it.

What went wrong? The river's culture and people were spurned to slavishly comply with ROS. The Act's intent was ignored. LAC required task force empowerment and commitment to the results; the agency proved unwilling. The EIS was overly delayed. An inexperienced ID team was uncommitted to the LAC plan and lacked knowledge of the river or its history. Decisions came without sound information. Access to public lands was needlessly limited.

#### **Randy Welsh**

Wilderness Coordinator Forest Service Federal Building 324 25th Street Ogden Utah 84401

Abstract Title: Comparison of Strategies for Rationing and Managing use on Selected Western Rivers in the United States in 1986 and 1998.

The demand for river recreation floating opportunities has caused river managers to limit and ration use. Currently nineteen popular river segments in the western United States have rationed use limits in place, most for over 20 years. Comparisons between the 1986 and 1998 floating seasons are made for these rivers. Assembled through a series of interviews and reviews of published literature a synopsis of these programs and the changes that have occurred over the last 12 years is shown.

The presentation provides insight into the physical and social characteristics of these nineteen river segments with rationed use limits in place during the 1998 floating season. Visitor use management on these rivers is described for the key elements of: application procedures, fees, rationed use limits, and regulations. Comparison is made for each of these key variables with the 1986 floating season. Key changes between 1986 and 1998 are highlighted including the rapid increase in fees, and the more subtle adjustments to regulations on each river. Suggestions for managing rivers in a regional context are made based on the findings. Other suggestions for sustainable river use planning are also offered based on the results of manager interviews and river data. Panel Sessions: Wednesday, December 1, 1999

10:30 a.m. - 12:30 p.m.

#### Panel: A Manager's Perspective on Boating Issues and Applications

#### **Jeff Hoedt** Chief Ohio Department of Natural Resources Division of Watercraft

Abstract Title: Recreational Boating -- Are the Waters Too Crowded?

Following World War Two, the number and types of recreational boats flourished with an awakened economy. By 1960, there were 2.4 million registered motorboats in the United States, increasing to over 12.3 million registered boats in 1997.

Since World War Two, there has also been a tremendous evolution in the design and controversies of recreational boats. While the pre-war boater was someone who operated a yacht, a canoe or a row boat, more recent technology has produced high-performance speedboats, runabouts, personal watercraft ("Jetskis"), sailboards, hovercraft, airboats, "high-tech" paddling boats, and even flying boats.

Combine this growing, competitive use with the relatively stagnant number of water surface acreage, and we find increased concerns over safety, environmental impact, balanced recreational opportunities and social/political issues.

Are carrying capacities the way to resolve these concerns? Is there research that correlates use levels to measures of safety, environmental impact, balanced opportunities and social/political issues? Many people perceive that carrying capacities will adequately resolve these concerns. Conversely, others feel that the limited data that exists is inadequate and does not establish this correlation.

Even within governmental entities there are conflicting directions. While some are implementing use limits on the number or types of boats allowed on certain waterways, there are substantial efforts to increase boating activity on these same waterways. Promoting increased use are the recent publication by the National Recreation Lakes Study Commission and the recent 5-year appropriation of \$36 million to the U.S. Fish and Wildlife Service to solicit more fishing and boating activity.

Given these differences in direction, are the waters too crowded? If they are, will carrying capacities resolve the concerns? Only time, good research, and rational leadership will help us to discover the true impacts of boating and their association to density of use.

#### William Jackson

Recreation Assistant Bureau of Land Management Little Snake Field Office Craig, CO

Abstract Title: The Lake Berryessa Boater Recreation Study: Bringing Balance to a Lake

In 1998, the US Bureau of Reclamation contracted with the Department of Natural Resource Recreation and Tourism at Colorado State University to conduct a boater recreation study that would fulfill the following objectives: (1) describe the boaters using Lake Berryessa and their boating activity; (2) document boaters=perceptions of and preferences for resource, social and managerial conditions on Lake Berryessa; and (3) measure and document the amount and character of recreational boating use occurring on Lake Berryessa during the primary boating season.

The information collected provides a baseline for evaluating existing boating conditions and targeting management actions to protect and improve the quality of recreation on the lake and to protect natural resources as demand for recreational use increases. The measurements used in the study have been developed and tested on various wildland recreation areas over the past two decades. More recently these measurements have been modified and tested on more than a dozen US Army Corps of Engineers=lakes. A combination of survey procedures was used to obtain visitor perceptions and document use patterns including on-site exit interviews at all boating access areas, mail surveys, and aerial boat counts/observations. The survey data as a whole supports management actions to protect the conditions necessary for certain types of recreation experiences. The experiences boaters are seeking and the threats they perceive to those experiences have been well defined throughout the study. Significant findings yielded by the study, how to interpret the data, and how to utilize the data for making informed management decisions will be the topic of this discussion.

#### Eric W. Natti

Resource Manager Bureau of Reclamation United States Department of Interior Lake Berryessa, CA

Abstract Title: Trying to Make Sense of it All: Now that we have the study, where do we go from here?

In 1998, the US Bureau of Reclamation contracted with the Department of Natural Resource Recreation and Tourism at Colorado State University to conduct a boater recreation study that would fulfill the following objectives: (1) describe the boaters using Lake Berryessa and their boating activity; (2) document boaters=perceptions of and preferences for resource, social and managerial conditions on Lake Berryessa; and (3) measure and document the amount and character of recreational boating use occurring on Lake Berryessa during the primary boating season.

Lake Berryessa, located in the north-central coastal mountains of Napa County, is about to realize significant change since the seven existing concession agreements will expire in less than ten years with no renewal preference rights. Change from existing long-term facilities and use to more short-term, day and overnight facilities and use are desired. Before prescribing change, existing boater use and their perceptions of the social and resource conditions needed to be better understood. Having this baseline information about the current perceptions and preferences of boaters on Lake Berryessa, as well as the current levels and type of use, will help the Bureau to make informed management decisions and evaluate the potential effects of any implemented change on boater use and behavior. What we learned, how we will use the information and what gaps we discovered will be the topic of this discussion.

# Panel: Barriers to the Application of Social Carrying Capacity Principles

#### **Don Bruns**

Recreation Planner Bureau of Land Management Colorado State Office

#### Joe Ashor

Recreation Planner Bureau of Land Management Grand Junction Field Office

Abstract Title: An Outcome-Based Approach: The Ruby Canyon Example.

Expanded conceptual frameworks for recreation management provide a more holistic view of how recreation adds value to or detracts from the lives of visitor and resident customers. Thirty years ago, many of us were taught that responsive recreation management was providing visitors the opportunity to engage in favorite activities.

Then two decades ago, we learned that people also have preferences for value-added experiences, realized by

participants, on-site, coincident with activity engagements. Research suggested that responsive managers should target these psychological outcomes because they are equally if not more highly-valued than the activities through which they are realized. Now the last decade has introduced us to a third recreation opportunity dimension: improved conditions and the prevention of worse conditions. Called benefits, these outputs accrue to participants as well as non participating communities, their residents, and their environment itself. This leaves us with a three dimensional recreation opportunity product: activities, experiences, and benefits.

Interaction of a wide variety of management inputs with the recreation system determines the nature and availability of recreation opportunities produced. Various classification systems have been devised both to describe existing characteristics and to prescribe future conditions of recreation systems. Once viewed largely in terms of physical attributes alone, and almost exclusively within the boundaries of specific recreation areas, we now know that social and managerial system components are equally important determinants of experience and benefit achievement. We also know that other recreation-tourism providers--beyond public lands and park boundaries and including both private sector service providers and local governments within gateway communities--greatly influence recreation opportunity character and availability. Despite these recent gains, the understanding of recreation management as a production process, and the importance of outcomes to customer satisfaction, managers sometimes till write objectives in terms of desired system attributes, and management actions are engineered around them. Thus the recreation system itself rather than its outputs remains a primary focus of traditional carrying capacity management.

#### John B. Davis

Program Coordinator for Environmental Studies Southern Vermont College 982 Mansion Drive Bennington, VT 05201

Abstract Title: Capacity-Based Standards for Recreation on the Niobrara River: a Case Study of the Importance of Clear Management Goals

Social carrying capacity studies can be used to identify standards for the number of visitors to an outdoor recreation site.<sup>1</sup> However, rational selection of a specific standard requires resource managers to articulate the type of visitor opportunity to be provided. River recreation management in the Fort Niobrara National Wildlife Refuge provides a case study of the relationship between management goals and public use standards derived from social carrying capacity research. Since the 1970's the number of people canoeing and tubing the Niobrara River within the refuge has increased from a few hundred each year to approximately 30,000 in 1997, raising concerns about the effect of crowding upon the quality of the experience for visitors.<sup>2</sup> In a survey administered in 1998 to a sample of river floaters, respondents were asked to rate the acceptability of a series of twelve photographs depicting a range of crowding levels on the river.<sup>3</sup> The results of the survey clearly indicate that the existing level of river use remains acceptable to a majority of respondents, but that visitor satisfaction has been significantly reduced by the continued growth in use. Two numerical standards of quality were identified for the number of vessels launching per unit time, but adoption of these standards by the U.S. Fish and Wildlife Service has so far proved elusive. Should the upper limit of river use be set at the most liberal standard, where on average only 50% of visitors are satisfied? Or should a higher standard be adopted to protect wilderness solitude? Should use be zoned by time of day, day of the week or season, to provide opportunities for both solitude and recreation? Without a clear statement of management goals, the results of the survey do not provide a way to choose between these options.

2 US Fish and Wildlife Service. 1999. Fort Niobrara National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Assessment. Valentine, Nebraska.

3 Davis, J. B., Lindvall, M. 1999. Social carrying capacity of the Niobrara River in the Fort Niobrara National Wildlife Refuge. Natural Areas Journal (in press). Glenn E. Haas

Professor Department of Natural Resource Recreation and Tourism College of Natural Resources Fort Collins, Colorado 80523

Abstract Title: Barriers to Carrying Capacity

The "life" of carrying capacity and its maturing from a concept to an accepted managerial practice has been fraught with ills. It has been burdened with the image of the recreational "Messiah," dismissed because of its lack of scientific determinism, feared for its likely day in court, avoided for its accountability, and framed as a special unique management decision-making process. The barriers to carrying capacity are many, but yet the intuitive appeal which recognizes that all built and natural environments have a functional capacity is too great to dismiss. This presentation will overview barriers which help to understand why recreational carrying capacity is still an adolescent, albeit some 40 years old. The barriers are thematically related to historic evolution, systems approach, institutional leadership, research program support, politics, managerial disposition, perspectives, and processes. The issue of capacity (supply) is central to the outdoor recreation profession, as it is with any profession or industry. Should we be able to inventory and measure outdoor recreation demand and supply beyond the general or macro level number of recreation activity participants, picnic tables, acres, miles of trails, parking spots, etc? This concern is one impetus for the 1999 Congress on Recreation and Resource Capacity. Suggestions on how to move forward are offered.

#### Laura Loomis

Director Visitor Experience Program National Parks and Conservation Association 1776 Massachusetts Ave., N.W. Washington, DC 20036

Abstract Title: From the Outside Looking In: Barriers to the Applications of Social Carrying Capacity Principles and Methodologies From the Perspective of a Public Lands Advocate

<sup>1</sup> Manning, R. E., D.W. Lime, M. Hof. 1996. Social carrying capacity of natural areas: theory and application in the U.S. National Parks. Natural Areas Journal 16(2):118-127.

National Park System units have been required to set "visitor capacities" since the passage of the National Recreation and Parks Act of 1978. To date, most park system areas have only dabbled with the concept of visitor capacities, usually applying it to defined linear resources such as backcountry trails and rivers. Understandable reluctance on the park of park managers to define the "average" visitor and his/her desired experiences, pressure by special recreation interest groups and meddling by Congress are some of the chief reasons preventing consistent application of social capacity principles and methodologies. A new general management planning process for national park system areas requires greater definition of future resource conditions and desired visitor experiences. If appropriately implemented it will force both the agency and the public finally to apply and develop the social science necessary to make wise visitor management decisions.

# Panel: Does Adjacent Land Use Affect a Protected Area's Carrying Capacity?

#### Larry Gamble

Land Use Specialist Rocky Mountain National Park Estes Park, Colorado

Larry will describe how adjacent land use has affected park management and the ways that capacity may have been limited as detected by RMNP s Related Lands Evaluation. He will also describe his work with local governments and with already established residents next to the park in order to mitigate the effects of adjacent development.

#### **Richard L. Knight**

Professor of Wildlife Biology Colorado State University Ft. Collins, Colorado

Rick will talk about the cross-boundary needs of wildlife and the effects of landscape fragmentation and increased human density on wildlife. He will also discuss the buffering (capacity increasing) effects of larger contiguous parcels and the interdependency that traditional owners of these parcels have with public land managers. Finally, he will discuss partnerships for reducing the fragmentation of adjacent lands.

#### **Mark Petroni**

District Ranger Madison Ranger District Beaverhead National Forest Ennis Montana

Mark is both a District Ranger and a County Planning Commissioner who will describe how the management of a Ranger District in the Greater Yellowstone ecosystem has been affected by the continued subdivision of adjacent lands. He will describe the implications for how staff must allocates their time, for the districts budget, for ecosystem health and visitor management.

#### **George Wallace**

Associate Professor of Natural Resources Colorado State University Ft. Collins, Colorado

George is both a county Planning Commissioner and protected area specialist, and will show how adjacent land uses can reduce or alter the visitation in parks. He will then outline the practical steps that protected area managers can take to influence the and use decision making process at the local government level. Actions which have helped to maintain, enhance or mitigate resource capacity and the visitor experience will be discussed.

#### Panel: GIS/GPS-Based Strategies for Monitoring and Assessing Recreation Impacts in Terrestrial and Aquatic Environments

#### **David Amme**

California Department of Parks and Recreation

Abstract Title: Monitoring the Impact of OHV Recreation on Wildlife Habitat: The Bottom Line

One of the major resource conservation challenges in park and open space management is determining the impact of humanity on wildlife habitat. The California Department of Parks and Recreation Off-Highway Motor Vehicle Recreation (OHMVR) Division is intimately involved with recreational impact issues through managing the State Vehicular Recreation Areas (SVRA) and administering the statewide Greensticker OHV grants program. The Greensticker program funds sustainable OHV recreation projects with the U.S. Forest Service, Bureau of Land Management, and other county and state organizations.

The OHMVR Division has developed a Habitat Monitoring System (HMS) based on strict legislative mandates for soil and habitat conservation. Good wildlife habitat monitoring is required to determine the direct and indirect effects of human recreation on wildlife. HMS integrates physical and biological components and interactions relative to the impact of OHV recreation on soil and wildlife habitat. Monitoring has to be measurable, practicable, and scientific. Data needs to be collected in the context of regional conditions, trends, and events. The type, intensity, frequency, and season of OHV recreation is essential information for a wildlife habitat monitoring program, without which wildlife habitat protection and management actions and prescriptions cannot be implemented. This presentation will review the HMS program and how it has been effectively implemented allowing California State Parks to more fully carry out its mission of providing for recreational opportunity while also protecting the environment.

#### Michael H. Legg

Assistant Dean and Professor of Forest Recreation Stephen F. Austin State University Arthur Temple College of Forestry Nacogdoches, TX 75962

#### Pei-yu Chen

Ph.D. Assistant at Texas A&M University Department of Forestry

#### Bonnie Brown, Ph.D.

Assistant at Stephen F. Austin State University Arthur Temple College of Forestry

Abstract Title: ORV Trail Inventory and Planning Using GIS: A Case Study

The Angelina National Forest in East Texas has a long history of informal ORV usage. In 1995 the USFS contracted with the Arthur Temple College of Forestry at Stephen F. Austin State University to inventory and evaluate the existing informal trail system and then design a formal designated Multi-purpose trail system. Over 200 miles of existing undesignated trails were inventoried using GPS units and evaluated to determine the suitability of each trail segment to be included in a designated trail system. Most of the trails were in an area called Longleaf Ridge that has been called the finest quality remnant of fire-maintained, oldgrowth upland, longleaf pine savanna in the western Gulf Coastal Plain. The area is habitat for the Red Cockaded Woodpecker, an endangered species, and three endangered plant species. Environmental groups want ORV's completely banned from the area and ORV groups wanted even more miles of riding area. The purpose of the design and planning process is to alleviate some of the conflict and to determine the feasibility of establishing a substantial trail riding area in Longleaf Ridge. GIS has been used to identify potential trail location using a hazard rating system. Highly erodable soils, stream crossings, red cockaded woodpecker colonies, archaeological sites, Heritage Natural Areas and other limiting factors have been identified and created as layers in a GIS program.

Due to limitations on the area imposed by the endangered species act and various court orders impacting National Forests in Texas the Longleaf Ridge Area will not support the number of trail miles needed. Using the same model an alternative area was located and trails designed that will enable the agency to provide the needed miles.

#### Charles Sidman, Ph.D.

University of Florida Sea Grant Program P.O. Box 110405 Gainesville, Fl 32611

Abstract Title: A GIS/GPS-Based Strategy to Monitor and Assess Recreational Boating Impacts on Florida's Urban Bay Waters

Sarasota Bay, Florida is a 35 square mile area with more than 83 miles of man-made waterways, residential canal systems and basins. More than 30,000 boats are currently registered in Manatee and Sarasota counties, which encompass Sarasota Bay. Over 5,000 boats access the Bay directly from 2,300 shore-side dock facilities. An increase in recreational boating activities in popular Bay areas has resulted in seagrass scarring, over-crowding and conflicts with shore residents. This presentation describes a strategy employing geographic information system (GIS) and global positioning system (GPS) technologies to monitor and assess recreational boating impact as a function of activity stress on surrounding natural habitats and shorefront residents at three test sites in Sarasota Bay.

Biophysical features including shoreline, bottom sediments, bathymetry, and seagrass beds are mapped with a GPS and are diver-verified. Shore resident tolerance towards boating activities is ascertained by a mail survey, and the results are mapped as distance isopleths. Recreational boating activities including jet skiing, power boating, sailing, fishing, anchoring, and living-aboard are inventoried over a one-year period with a GPS and laser range-finder. Biophysical, social, and boat activity information are integrated within a GIS. Map-defined water use suitability zones are developed for boating activities by combining biophysical and shore resident tolerance information. A multi-overlay composite scoring approach defines zones depicting areas of low, medium, and high activity suitability. Boater activity monitoring is used to compare observed on-water utilization to derived suitability zones. A comparison of zone suitability with utilization identifies potentially vulnerable areas within a site. The Regional Harbor Board uses this information to identify locations requiring more detailed environmental monitoring or active management.

# Panel: Recreation Use of Horses on Public Lands

#### Mylon Filkins, D.V.M.

Backcountry Horsemen of California 4408 Wible Road Bakersfield, California 93313

Abstract Title: Backcountry and Wilderness Recreation Using Saddle and Pack Stock

BACKCOUNTRY HORSEMEN OF CALIFORNIA

BCHC is an organization of 4,000 private recreational saddle and pack stock users in 25 local units. Our purpose is to perpetuate the common sense use and enjoyment of horses in our back country and wilderness lands. We believe through education, volunteer service and vigorous participation in public land management we can achieve harmony with the capacity of our public lands and preserve the historic rights of horsemen to backcountry trails and forage areas.

• BCHC PERSPECTIVE:

Backcountry Horsemen of California believe that our backcountry and wilderness resources are to be managed for the use and enjoyment of the American people. People with variable abilities and interests. Man is a natural part of the ecosystem and is a social animal. We must preserve the opportunity to enjoy our natural resources in family and group fellowship. Changing demographics and population brings in a need for more trail heads, trails and campsites. Resource management by exclusion or reduction is not a reasonable alternative for the millennium. We must keep sight of the big picture. The total resource must be considered. Seasons, wet and dry cycles, time itself all affect the backcountry resource. The resource is forever changing - the impact of some use or capacity may not be a long term factor. Long term consistent monitoring i.e. "vital signs" can help direct management. The best of science

with peer review must be utilized in backcountry management.

EDUCATION

Backcountry Horsemen believe education of horsemen and the general public is the vital component in achieving harmony in the backcountry resource. <u>Education</u> of all backcountry users as to trail ethics and backcountry etiquette. <u>Education</u> and familiarization of agency personnel and other users on the use of horses and mules, their habits, requirements for travel/feed and restraint.

• SERVICE

Agencies must solicit and encourage volunteers and support their effort with training and insurance programs. In 1998 BCHC documented a contribution of \$1,000,000 in labor and service to our California backcountry.

#### COLLABORATION

BCHC endorse the collaboration and cooperation of all back country users. Our group has had partnerships with the USFS, BLM, NPS, NOLS, Sierra Club, American Hiking Society - Californian Conservation Corp and California Department of Fish and Game.

 PUBLIC PARTICIPATION IN FEDERAL LAND MANAGEMENT

The public must considered an integral and valuable part of the decision making process.

• BCHC PHILOSOPHY

We have a responsibility to preserve the back country resource along with the opportunity for it's use and enjoyment.

#### Gregory C. Jones, MD

Member, Board of Directors Kentucky Horse Council

Abstract Title: Moving Beyond Fake Science

As a physician, I have seen many people injured due to the application of science that is poorly developed, misinterpreted or misapplied. It is an integral part of my job to analyze new information and to ask the questions:

- a. Was this study properly designed?
- b. Was there bias in data collection?
- c. Were the results statistically valid?
- d. Did the results support the conclusions?
- e. Is there another reasonable alternative conclusion?
- f. Is this information sufficiently compelling to effect change?

When these questions are applied to the information available on horse trails, I am appalled by their general inadequacy as science. Of the studies that I have seen, few, if any were developed in the context of the scientific method.

The propensity for applying conclusions from anecdotal or poorly developed data is also appalling. The extrapolation of findings from one ecosystem to another seems to be common. The result has been to develop conclusions that are unsupported by sound science.

Practices such as referencing the impacts of cattle on Central American rain forests as a basis for policy regarding horses in North American ecosystems must end! The limits on access to public lands is an issue of interest to all Americans. Decisions on those limits should be made in the full public arena, and they should be guided by sound science that objectively informs the citizenry and their policy makers.

We must identify the pressing questions, and design sound science That will guide us in managing our trail systems. This will time, and it must be a continuing process. In the meantime, reasonable controls will be needed, but they must be: 1) openly made; 2) contingent upon future scientific findings, and 3) based on user/manager consensus.

#### Ann Lange

Chairwoman Wilderness/Public Lands Planning Committee Back Country Horsemen of America 14934 Highway 178 Lake Isabella, California 93240

Abstract Title: The Spirit of Wilderness Recreation and Resource Capacity - A User Perspective

Specific to Wilderness: We are going on a visual journey to observe some of the magnificent country called WILDERNESS; to briefly review frontier history and its relationship to wilderness; to discuss some of the concerns of Backcountry Horsemen regarding determination of recreational carrying capacity in wilderness.

The Wilderness Act of 1964 contains the dual purposes of "allowing natural processes to operate freely" and providing "opportunity for solitude or a primitive and unconfined recreation." How do concepts such as the "Minimum Tool Concept" relate to regulation of wilderness access? Do current allowable use standards in wilderness planning documents realistically and adequately define carrying capacity? And what are the associated costs and trade-offs of regulation of use?

Of course, the effects of recreation use on the environment are legitimate concerns. Back Country Horsemen of America certainly support reasonable regulation as needed to protect the resource. But we are faced with a real dilemma here. Wilderness recreation is unconfined recreation - unstructured, unrestricted. Paradoxically, that type of experience is threatened by the same policies and regulations that are designed to protect those experiences. In other words, as we have more regulation, we have more trouble providing the very unregulated, unrestricted experiences that wilderness travelers desire. The key questions remain, "How do we strike a balance between use and protection? How much change is acceptable? How many visitors should be allowed to travel into wilderness?"

We all bear some responsibility for irresponsible wilderness travelers. Backcountry Horsemen accept this responsibility and believe that many times there are alternatives to setting capacity limits in wilderness such as "Leave No Trace" or "Gentle Use" educational programs and volunteer service maintenance and rehabilitation projects. Finally, we believe the only way to solve capacity issues is by working and planning collaboratively together in partnership efforts.

#### Patrick Douglas Marah

USDA-Forest Service Grand Mesa Uncompany and Gunnison National Forests

Abstract Title: Putting on The White Hat in The Backcountry

"We judge ourselves by what we feel capable of doing; others judge us by what we have done." These words by Henry Wadsworth Longfellow deserve careful consideration by those of us who use livestock in backcountry recreation.

Riding and packing animals that may average onehalf ton in weight over narrow trails under a wide array of weather, soil and slope conditions has the potential to cause substantial adverse impacts on the ecosystem, as well as generating conflicts with other types of trail users. However, these undesirable consequences can be minimized, mitigated or altogether avoided by careful, thoughtful, and skillful use of saddle and pack stock. It is imperative that we develop and maintain high standards of trail etiquette and ethics if we are to expect the indulgence of public land managers and other trail users. We claim a right to reenact the wildland travel processes inherited from our ancestors – a "recreation" of our past. However, we do not have the right to degrade the ecosystem or wildland experiences of others.

The methods of harmonizing saddle and pack stock trail users with other trail users and the ecosystem itself are only commonsense. The Leave No Trace program is accepted and applauded by land managers throughout the Nation. This program offers a course specific to backcountry stock users, and it should be taken. In addition, Back Country Horseman's Association offers clinics on backcountry horsemanship skills that should be attended. Finally, the Back Country Horsemen of America have developed an array of materials on trail etiquette and ethics. These principles of conduct should be studied and heeded.

#### Steve D. Ralls

Director of Legislative Affairs American Horse Council

Abstract Title: Importance of Trails to the Horse Industry

Recreational use of horses is the largest, and fastest growing, segment of the United States horse industry. More than half of the individuals involved in the horse industry name recreation as their primary equine activity, and more than three million horses in the United States are used for recreational purposes.

Recreational activities on horseback have an economic effect of \$28.3 billion and generate full-time employment for more than 317,000 people.

Congress has taken note of the importance that trails have in the lives so many people, including horseback riders. The Transportation Equity Act of the 21<sup>st</sup> Century passed by Congress in 1998 provides money for the development and maintenance of public trails through the Recreational Trails Program (RTP). The RTP is the continuation of an earlier government program known as the National Recreational Trust Fund Act. Congress has authorized the RTP for \$30 million in 1998, \$40 million in 1999, and \$50 million annually for 2000, 2001, 2002 and 2003.

The nationwide interest in trail riding has grown to include organizations devoted to preserving trails. Horse enthusiasts across the country are searching for vacations on horseback in scenic locations. These people simply find respite from their busy lives with a few hours a day or each week on horseback. This peace of mind that so many recreational horseback riders find is possibly the most overlooked benefit of the horse industry.

The horse industry as a whole, and particularly the recreational trail riders, must begin to be more aware of what is happening nationally in relation to trail availability. The recreational trail rider has huge potential in providing the grassroots contacts with elected officials to ensure that riding opportunities will continue to be available.

Gene W. Wood Clemson University Clemson, SC

The availability of trails on wildlands and where saddle and pack stock can be used provides for a recreational experience based on both cultural and natural heritages. Our ancestors crossed the Atlantic coastal plain and piedmont, the Blue Ridge of the Appalachians, the Mississippi Embayment, the prairies, plains, deserts, the Rockies, the Sierras, the Cascades and descended to the Pacific shoreline with this mode of travel and transport. In our present world, we may be living what they might have dreamed. And when we ride out into wildlands, we dream and attempt to reenact what they lived.

Like other kinds of wildland recreation, horse trail recreation is about solitude, challenge, and risks, but just as importantly it is about human-horse companionship, knowledge of the animal and the land which you both traverse, and a sense of horse-human-land harmony in a wild and scenic setting. It is in this experience that trail horsemen become renewed and re-created. It is here that they accumulate the memories to be dreamed when they return to the conveniences and routine of the modern, organized world.

But what of these resources that we so enjoy? Can they be sustained quantitatively and qualitatively in a world where at least three million people mounted on horses want to interact with the land? Can the quality experience be achieved when millions of other trail users with different values want to use these same resources? How do we assess the land's capacity to accommodate these interactions - these uses?

This session will address the recreational use of horses on wildlands in the context of user demands, impacts on ecosystem values, the science that assesses impacts and guides policy and management, and the knowledge and skills needed for appropriate recreational use of horses on wildland trails.

#### Panel: Managing Visitor Capacities on the Front Lines - The State Parks Perspective

Report on a Visitor survey by R. Neil Moisey, Ph.D. and Dawn K. Frederickson, University of Missouri, School of Natural Resources, Department of Parks, Recreation, and Tourism, under contract to Missouri Department of Natural Resources, Division of State Parks, February, 1999. Presented by Bill Farrand, Deputy Director, Division of State Parks.

Abstract Title: Survey of Visitor Satisfaction with Johnson's Shut-ins State Park, a limited access park, 16 years after development of visitation controls.

Johnson's Shut-ins State Park is an 8,470-acre natural area in the St. Francois Mountains of southeast Missouri. The park is named for a natural gorge on the Black River, where the granite riverbed is braided by the stream into a series of waterfalls and potholes. The formation is known locally as a "shut-in". This formation is a popular swimming area that is the focal point of park visitation, creating issues of resource damage and visitor safety. In 1982, the park was closed and redeveloped with 52 designated campsites and a day use parking area for 100 cars. Access control was established by placing a gate at the park's single entrance. When parking and camping are full, no car is allowed into the park until a car leaves the park. One quarter of the park visitors are required to wait an average of 28 minutes to enter the park. In the first survey of park visitors since establishment of access control, 99% of the visitors were very or somewhat satisfied with the park. Visitors reporting perceptions of crowding totaled 74%, and 81% felt access should remain the same.

#### Panel: (Not So) Free Wheelin' and the Motorization of Public Lands: Economics over Ecology?

George Nickas Executive Director Wilderness Watch Box 9175 Missoula, Montana 59807

Abstract Title: Recreation and Resource Capacity: Trouble Brewing for Wilderness A recent survey of Wilderness managers found that recreation overuse is the most commonly stated resource problem. Controlling visitor impacts, however, is proving difficult for several reasons. Wilderness visitation has grown steadily since 1964 with at least one-half of all areas receiving their highest use levels during the 1990s. Along with the increase in use has come an increase in impacts. And along with the increase in impacts has come growing opposition to restrictions designed to safeguard Wilderness.

The opposition comes from many fronts. It includes user groups more concerned about access than preservation, such as the ruckus created by the climbing community when the U.S. Forest Service banned the permanent installation of metal anchors and bolts in Wilderness. It includes commercial interests, like outfitters in the Frank Church-River of No Return Wilderness, who flipped over a management plan that would reduce crowding and wildlife displacement on Middle Fork of the Salmon River. And it includes Congress, where no less than a half-dozen bills and "riders" were introduced in the last session to overturn agency decisions preventing such things as commercial helicopter tours in Alaska Wildernesses, truck portages in the Boundary Waters Canoe Area Wilderness, and using solitude as one criterion for Wilderness management and protection.

The future of our nation's Wilderness heritage depends largely on whether recreationists and the recreation industry concentrate more of their energy on protecting the wild rather than making their use of it more convenient or safe.

#### **Nicolette Phear**

Faculty, Adventure Education Prescott College 220 Grove Avenue Prescott, AZ 86301

Abstract Title: Life, Liberty and The Pursuit of Whatever You Damn Well Please

With rising numbers of organizations using public lands for educational and guided recreational purposes, and increasing client demands for adrenaline experiences, there has been mounting opposition to restricted use. There is growing Western need to travel to remote areas, preferably via highrisk adventure. College students take classes in rockclimbing, whitewater kayaking, extreme skiing. Corporate executive vacations include rafting remote rivers and scaling 8,000 meter peaks. The outdoor industry (both motorized and non-motorized) has capitalized on and promoted this desire for adventure through their marketing.

Nature becomes the foreground in which to test the newest product, challenge personal limits, and conquer nature's forces. The consequences? More and more people and companies are flocking to far-reaching rockwalls, rivers canyons and mountain peaks.

Increasingly they are demanding access to remote places. In guided recreational trips and outdoor programming there is often more emphasis on having "peak" experiences than environmental considerations.

Environmental education rarely extends beyond minimal impact training and perhaps a few "service" activities. It seems imperative that outdoor guides and educators not only educate users about their social and ecological impacts, but critically examine the values they promote. What do we and our clients seek through these adventures? What is our obligation to the places in which we guide and educate? When should we question the "pursuit of happiness" and limit our activities on public lands? At what point do we choose, simply, not to go at all?

Scott Silver Wild Wilderness 248 NW Wilmington Ave. Bend, OR 97701

For those who accept Thoreau's famous saying: "In wildness is the Preservation of the World", these are critical times indeed. America's wild and natural places are perhaps in greater danger than at any time in recent history. The commercial value of outdoor recreation has been discovered, and the 'Wilderness Experience' has become a hot commodity. Federal land-managers are racing headlong to turn outdoor leisure into saleable products that can be marketed in the same way Proctor and Gamble markets soap.

Unless we halt this trend, the American Outdoors will soon be transformed into little more than a series of highly structured themed-parks and scripted adventures. Through the growing use of interpretive attractions and similarly crafted visitor services, our public lands themselves will become the vehicle through which the concepts of nature will be defined and redefined. Just as Disney instills upon its visitors a 'Man as Consumer' message in its constructed environments, those who visit the recreationally optimized public lands of the 21st Century will be served up a Disneyfied version of nature with a similarly corrupted message. What would Thoreau say?

No amount of money can purchase the satisfaction of a hard-earned 'Wilderness Experience' but, a lucrative market may well exist for cheap, easily consumable facsimiles of Nature. Federal land managers are even discovering that by developing and building such things as interpretative viewing areas, it is possible to even sell the sunset.

Will edu-tainment, eco-tainment and wreckretainment prove to be significantly more benign uses of the lands than logging, mining and grazing? Should public lands be managed to provide markedly enhanced opportunities for developed recreation and commercial tourism? Is "Collaborative Stewardship" something other than a new way to say: "Wise Use?" These are questions we must ask as we debate the issues associated with public lands management for the coming millennium.

#### Bethanie Walder

Director Wildlands Center for Preventing Roads P.O. Box 7516 Missoula, MT 59807

The Wilderness Society was created to fight roads and recreational impacts on National Forest lands. Aldo Leopold understood, as long ago as the 1920s, that recreation on public lands could destroy them. He and several others created The Wilderness Society in the 1930s specifically to deal with the impacts caused by roads and motorized recreation. In the ensuing years, logging became a more significant threat to the ecological integrity of the public lands and wilderness advocates focused on stopping resource extraction in ecologically and recreationally important places.

In 1999, public lands management has come full circle. For example, the Forest Service now finds that nearly 75% of the revenue generated from activities on the National Forests comes from recreation. But while outdoor recreation is up, funding is down, and public land managers are looking elsewhere for much needed funds. The result is a push for public/private partnerships which will do no more than result in the privatization, commercialization and motorization of public lands.

While concerned citizens have long challenged the ecological and economic impacts of logging and other resource extraction on public lands, industrial recreation has remained in the background. The recreation industry, however, has positioned itself closely with public land management agencies, opening up new doors for private profit from public lands. Money for recreation also buys input into recreational management - and that is likely to result in decisions that favor economics over ecology.

If public land agencies manage industrial recreation the same as they have other resource extraction, we will end up with the same impacts boom and bust economies for surrounding communities and the destruction of the ecological integrity of the land. Is there another way?

#### Panel: Resolving Carrying Capacity Problems: Do Numbers Really Matter?

#### Tracy A. Farrell

Doctoral candidate VA Tech Department of Forestry Balcksburg, VA 24060

#### Jeffrey L. Marion

USGS Patuxent Wildlife Research Center CPSU VA Tech Department of Forestry 304 Cheatham Hall Blacksburg, VA 24060

Abstract Title: A Critique of Carrying Capacity Applications in Developing Country Protected Areas

Developing Countries, particularly in Central and South America, have tended to use informal decision making processes to inform managers about the occurrence and severity of impact problems and carrying capacity estimates. In some cases, complicated equations have been developed to determine carrying capacities, typically based on administrative capabilities like number of staff, size of facilities, or length of trails.

Developing country protected areas are experiencing natural resource impacts related to visitation, in spite of carrying capacity limits. U.S. researchers and managers have found the traditional carrying capacity concept to be overly restrictive and biased towards use limitation as the principal management response. Scientific studies and management experience have documented the importance of numerous other use-related, environmental and managerial factors.

U.S. managers have largely abandoned traditionally carrying capacity frameworks in favor of other decision making frameworks like LAC and VERP, which offer greater management flexibility and a broader focus on alternative strategies and tactics. However, developing country protected areas are severely limited with respect to personnel, time and funding, indicating that carrying capacity has certain merits as a more simplistic and perhaps realistic approach.

The intent of this presentation is to discuss carrying capacity application and development, and its relative advantages and disadvantages for selected developing country protected areas. We will also discuss the effectiveness of the various management strategies and actions employed by developing country protected area managers to minimize visitor impacts (including use reduction). Innovative and creative solutions have been employed by some developing country protected area managers in response to visitor impact problems, solutions that could also be employed in U.S. protected areas.

#### Yu-Fai Leung

Department of Parks Recreation and Tourism Management North Carolina State University

#### Jeffrey L. Marion

USGS Patuxent Wildlife Research Center Virginia Tech Cooperative Park Studies Unit

Abstract Title: Solving Recreation Carrying Capacity Problems without Use Reductions: Some Empirical Examples

Resource impacts resulting from recreational and tourist activities have been a growing management problem in parks, wildernesses and other protected areas, increasingly challenging managers to find effective solutions to control such impacts while sustaining visitation. Traditionally, managers have looked for solutions from a carrying capacity perspective. In the past, their efforts have been directed at determining a numeric capacity for their resource. More recently, public debates continue to arise in numerous public land management planning efforts involving controversies related to use limitations embodied in planning documents. Decades of research and management experience in the park and recreation fields, however, have demonstrated that numeric carrying capacities and related use limitations are not always the most appropriate or effective response to visitation-related social or resource impacts. Rather, use reductions should be considered as one of many alternative options for addressing such troublesome recreation management problems.

The objective of this paper is to provide empirical support to the premise that management interventions other than use reductions can be effective in avoiding or minimizing visitation-related resource impacts. Campsite assessment results from several national parks where different management actions have been applied will be discussed and compared. These examples include Isle Royale National Park, Big Bend National Park, Great Smoky Mountains National Park, and Delaware Water Gap National Recreation Area. Factors that have contributed to the success and failure of these programs will be presented with discussions directed at the implications for other recreation settings such as trails and attraction areas.

#### Jeffrey L. Marion

Unit Leader and Scientist Coorperative Park Studies Unit Virginia Tech Department of Forestry U.S. Geological Survey VA 24061- 0324

Abstract Title: Resolving Carrying Capacity Problems: A Review of Management Strategies and Actions

By virtue of their massive numbers, protected area recreationists pose a real and significant threat to the very resource they so cherish. This is particularly true at protected area attraction sites, campsites, and trails, where visitation and its effects are concentrated. Specific consequences of visitation to these areas include the trampling and subsequent loss of ground vegetation, shrubs, tree seedlings, and felling of saplings; erosion of surface litter and humus; exposure, erosion, and compaction of soil; and exposure of tree roots and damage to tree trunks.

Protected area managers recognize the need for visitor management and resource protection programs to balance visitation with its associated resource impacts. Expanding visitor use increasingly challenges managers to develop and implement management policies, strategies, and actions that permit recreational use of protected areas while preserving their ecological and aesthetic integrity. Three categories of influential factors and their potential for manipulation by managers are reviewed: use-related, environmental, and managerial factors. Use-related factors include type and amount of use and visitor behavior. Environmental factors include various physical and biological attributes (e.g., vegetation and soil type, topography, climate) that influence the type and extent of recreation impact. Managerial factors include visitor impact management strategies (e.g., dispersal vs. containment) and actions (e.g., development of visitor facilities, educational programs, regulations).

This review illustrates the large and diverse array of options available to managers for avoiding and reducing visitor impacts. Limiting visitor use, a traditional but controversial response to carrying capacity problems, can often be avoided by implementing one or more of these alternative actions. The selection of appropriate and effective management interventions must be guided by a thorough problem analysis so that actions will address the underlying causes of problems. Managers are also cautioned to consider the costs of implementation and costs to the quality of visitor experiences associated with alternative actions.

#### Panel: Wildlife Task Force: Planning Trails with Wildlife in Mind: A Handbook for Trail Planners

#### **Paul Cawood Hellmund**

Hellmund Associates Natural Resource Planning 2931 Tumbleweed Lane Fort Collins, CO 80526

Abstract Title: Planning Trails with Wildlife in Mind: A Dozen Key Concepts

To aid trail planners in considering wildlife issues, a Colorado State Parks task force reviewed existing knowledge of wildlife/trails interactions and developed a handbook for communicating such information. Twelve key topics are presented:

- A. Trails and their zones of influence: Changes to a trail's surroundings may extend for hundreds or even thousands of feet on either side of a trail.
- B. Avoiding large natural areas: Protecting large, undisturbed areas of wildlife habitat should be a priority.
- C. Tools for a broader view: It's only when looking at the broader landscape over time that one can discover how wildlife use a place.
- D. Habitat quality varies: Types of habitat vary widely in the number and kinds of wildlife using them.
- E. The importance of streamside areas: Riparian areas play a disproportionately large role in maintaining biodiversity.

- F. Species and places of special interest: The degree to which the law protects species on the list is complicated and varies depending on the individual species.
- G. A site's existing impacts: The specific wildlife goals for a trail will depend in part on how disturbed a site is.
- H. How wildlife respond to trails: While the construction of a trail directly impacts the habitat it displaces, once a trail is built, its physical presence also can change its environs.
- I. What happens to plants near trails: The most readily observable impact of trail recreationists is to vegetation near trails.
- J. Managing trails with wildlife in mind: An understanding of how a trail will be managed should be part of planning the trail.
- K. Making informed decisions: Deciding whether the recreational value of a trail outweighs it potential impacts to wildlife is a community choice, or in some cases, a legal question.
- L. Land ownership: Many longer trails cross from one jurisdiction to another and there may be changes in wildlife policies.

#### Stuart Macdonald

Colorado State Trails Program

Abstract Title: Trails and Wildlife

Some urge more caution about building new trails or increasing use on existing ones. Others think trail impacts are far outweighed by their benefits. While the available research doesn't clearly support either viewpoint, everyone wants to cite research to prove what they believe.

But environmental systems elude simplification. Yes, elk chased by snowmobiles will burn more calories, but they also burn fewer calories and find more food when they stroll down packed trails. Yes, vireos nesting within 50 feet of a trail may raise fewer young, but does that actually affect the area's vireo population? And is that difference measurable when compared to routine impacts of climate, domestic cats, lighted skyscrapers, radio towers, or Nicaraguan coffee-growing practices in their winter habitat?

Colorado convened a Trails and Wildlife Task Force to discuss interactions between trails and the environment, creating "Planning Trails with Wildlife in Mind: a Handbook for Trail Planners," which concludes:

• In many cases, the trail system itself is a tool for managing and limiting the impacts of visitors to a natural area.

• In building a trail, we may choose to impact wildlife and habitats, but we should do so with an understanding of the implications.

In many cases, scientific knowledge alone can't determine whether wildlife impacts are great enough to preclude a trail. The decision also should be based on community values.
Understanding both the existing and potential impacts of a trail to wildlife can help set more realistic goals for a trail project.

• The best strategy is always to avoid impacts to wildlife. The next best is to minimize the impacts. The last resort is to mitigate for impacts.

• Plan and manage a trail in ways that help make users more predictable to wildlife so they can acclimate to people.

The Handbook is available if you send a 9" X 12" self-addressed envelope with six first-class stamps to Colorado State Parks, 1313 Sherman St. Rm. 618, Denver CO 80203. It can also be downloaded from the Trails and Wildlife index page at www.outdoorlink.com/amtrails/resources/index.html.

#### Mark Raming

Vice President SWCA Environmental Consultants 8461 Turnpike Drive, Suite 100 Westminster, Colorado 80030

Abstract Title: Consideration of Wildlife Resources in the Development of Antelope Island State Park Back Country Trail Management Plan

Antelope Island State Park, situated 10 miles from Salt Lake City in Great Salt Lake, is one of Utah's largest state parks. Because it is an island, the Park has had an historic appeal both to wildlife and recreational interests. From the perspective of wildlife, the island provides a geographically isolated ecosystem, where many disruptive variables related to urbanization can be controlled. This has resulted in the introduction of numerous large herbivores, such as bison, antelope, bighorn sheep and elk. From the perspective of recreation, the island provides a spectacular landscape where one can quickly escape urban influences and experience broad ocean-like vistas, white sand beaches, and abundant wildlife. The importance of the island to wildlife interests has kept the majority of the island closed to recreational public access. Recreational interests expressed a desire in having full access to the park, and in 1995 the newly created Master Plan identified the broad conditions by which this access could be made possible. The Park assembled a Wildlife Advisory Committee that included experts from academia and other agencies. It was concluded that a backcountry trail plan should be developed, but that it should include management guidelines to protect wildlife from recreationists and visa-versa.

The process for plan development involved working with the Wildlife Advisory Committee to map critical seasonal habitat for each of the species of concern, identify logical trail destinations and alignments, catalog critical limiting wildlife and recreational resources, and develop management guidelines for trail use. The key elements addressed in development of the plan included the frequency, predictability, timing, location and behavior of trail users. These elements were assessed in relationship to the breeding, foraging, and rearing needs of special interest wildlife species. The key wildlife/trail recreation parameters and final management recommendations are discussed in this presentation. Panel Sessions: Wednesday, December 1, 1999

2:30 p.m. - 5:00 p.m.

#### Panel: Coastal and Marine Recreational Carrying Capacity - Who's Minding the Shore: A Sea Grant Perspective?

#### Lilian Alessa, Ph.D.

Asst. Professor/Director The Environment Program Roanoke College Salem Virginia, USA

#### Heather Holmes, B.Sc.

Parks Canada (Pacific Rim National Park) British Columbia, Canada.

We are using invertebrates and seaweeds as indicators of biological impacts from human activities that are observed concurrently, and correlated both spatially and temporally. We are also studying motivations for collecting/disturbance behavior. This latter component will aid in the design of more effective education methods, i.e., consequence-based education. In 1999, we documented collecting and disturbance episodes by obstructed photo monitoring and, through casual conversation rather than "interviews", we attempted to survey some of the motivations for each episode (n=152). We also determined preliminary patterns of changes in the distribution and abundance of key intertidal species. Our data indicate that large areas (50 m x 500 m) of intertidal zone are experiencing the removal of key invertebrate predators belonging primarily to the phyla Echinodermata and Mollusca. While the long-term effects of this are unknown we measured an increase in cover and a decrease in the biodiversity of seaweeds as well as the distribution and abundance of intertidal fish. We also measured percent barnacle loss in accessible intertidal areas beyond a baseline of winter storms and found up to 58% of rock area lacking living barnacle cover. Some categories of motivations for collecting and/or disturbing flora and fauna in the intertidal zone included a) subsistence based on "experiencing living off the sea" or for the manufacture of jewelry and souvenirs for tourists (n=49, and/or b) curiosity, almost always facilitated or encouraged by a parent, grandparent or guardian (n=124), and/or c) lack of awareness of the nature of the substrata of the intertidal zone (n=112) and/or d) play (n=44). The majority of visitors to Pacific Rim National Park expressed an understanding that the intertidal zone was a "wasteland" or "dead zone" (n=112).

#### Walter Clark

Legal and Policy Specialist North Carolina Sea Grant North Carolina State University

Abstract Title: Defining the Aquatic Commons: Finding a Balance in Managing Uses of Our Public Waters and Submerged Lands

Walter Clark will discuss a current Sea Grant research project that has implications for recreational carrying capacity in North Carolina and the nation. The project involves an assessment of the legal guidelines for determining the boundaries between private and public lands and waters along the shoreline (defining the aquatic commons). It undertakes an inventory of the types of private uses that have been traditionally allowed on public waters and submerged lands. It also looks at contemporary public uses of these areas. Finally, the project looks at some of the management techniques that attempt to balance private and public uses of the aquatic commons. The ultimate objective of this project is to develop a set of recommendations for managing North Carolina's public waters and submerged lands. These recommendations could have application in other jurisdictions.

#### James M. Falk

Director

University of Delaware Sea Grant Marine Advisory Service Lewes, DE 19958

Abstract Title: Water-Use Planning in Delaware's Inland Bays: Addressing Recreational Boating Carrying Capacity Issues

Delaware's Inland Bays are a series of three shallow-water coastal lagoons (Rehoboth, Indian River, and Little Assawoman) located in southeastern Delaware. Over the years the bays have seen rapid residential, shoreside development. This development and increase in permanent and seasonal residents has placed intense demands, especially during the summer months, on the bays and its resources. Boat traffic has been increasing and changes in the types of vessel have also been apparent. In recent years, jetskiers and boardsailors compete with traditional fishermen and recreational crabbers. Along with the increases and changing activity patterns comes new competition between users which creates crowding and safety issues, as well as impacts to the environment.

As early as 1991, the University of Delaware Sea Grant Program began to identify these changes and to document conflicts and competition among the various boating segments.

By 1995 the state of Delaware had completed a Comprehensive Conservation and Management Plan (CCMP), as required by the Environmental Protection Agency, as part of the National Estuary designation the bays had received. A key component of this plan was the recommendation to develop an Inland Bays Water-Use Plan to address on-water uses, primarily recreational boating. The University of Delaware Sea Grant Marine Advisory Service provided direction and leadership to complete this task in 1999. The task involved reviewing findings from earlier studies, conducting stakeholder meetings, and analyzing other appropriate information. These actions helped to frame the issues and arrive at solutions to develop a plan for managing water-use activities in the future. A detailed set of recommendations and actions were developed that direct key agencies and organizations on ways to address recreational carrying capacity issues, among other concerns, relative to recreational boating on the bays. Currently a Water-Use Plan Implementation Committee is monitoring the completion of the actions.

#### Leigh T. Johnson

Marine Advisor University of California Sea Grant Extension Program San Diego, CA 92123

Abstract Title: Sustainable Environmental Stewardship Education for Recreational Boaters

During 1993-1996, Sea Grant Extension Program (SGEP), San Diego County, California educated marina managers and boaters on pollution prevention with USEPA funding. Attitudes began to shift toward environmental stewardship. Sustained educational efforts were needed to establish BMPs as standard practice among 10,000 boat owners in three local harbors and many owners of trailered boats.

How could this best be achieved? Cooperative Extension's philosophy is to develop educational programs and transition them to users. In 1996 California Department of Boating and Waterways (CDBW) provided an opportunity to move educational leadership into the boating community.

CDBW offered Clean Vessel Act funds to SGEP to educate local boaters on using sewage pumpout stations. SGEP recommended funds be given to the local Coast Guard Auxiliary, instead. With support from the Coast Guard Marine Safety Office (MSO), the Auxiliarists developed a phenomenally successful environmental outreach program. They established a visitor center, partnered with radio stations on PSAs, developed and staffed an exhibit with a model pumpout station at boat shows and other events, and distributed thousands of canvas bags with educational materials on boating pollution prevention. With their encouragement, a yacht club leader used SGEP and other materials to write his own BMP guide for boaters.

In 1999 the SGEP and the MSO trained Coast Guard Auxiliarists and Reserves, who conducted seminars on pumpout station use, hazardous waste disposal, related laws, and environmental impacts of boating pollution. Seminar evaluations found large increases in boater knowledge and intention to use pumpout stations. Afterwards, boaters engaged in heavy radio traffic on seminar topics. Auxiliarists are monitoring pumpout stations to determine how much sewage is being diverted from harbors and into treatment plants, because of these programs.

Lessons learned include: develop participation, cooperation and leadership among key players and use multiple efforts and methods.

#### Jack Thigpen, Ph.D.

Coastal Recreation and Tourism Specialist North Carolina Sea Grant Program

#### **Elizabeth Winstead**

Department of Parks, Recreation and Tourism Management North Carolina State University

Abstract Title: Recreational Carrying Capacity in Coastal Waters: Reducing Conflicts Between Saltwater Sportfishing User Groups

North Carolina's coastal and offshore waters are used by many different sportfishing user groups. Offshore charter boats, head boats, inshore fishing guides, private recreational boating anglers and others compete daily for the same fish species. As these coastal and marine waters receive more pressure, unpleasant and dangerous conflicts are increasingly common. To better understand these conflicts and how they might be reduced, a joint project between NC Sea Grant and recreational fishing interests conducted personal interviews during the summer of 1999 with the primary user groups to identify the sources of conflict and how these incidents could be reduced. This paper reports findings of this project and the resulting planned outreach and extension efforts.

#### Panel: Ecotourism in North America

#### **Dennis Haddow**

Air Program Manager Rocky Mountain and Intermountain Region USDA Forest Service

Abstract Title: The Air Pollution Threats to Wilderness and other Scenic Areas in Colorado

Existing and potential air pollution emissions in Colorado have the ability to cause adverse impacts to the user experience in many scenic areas of the State. Research indicates that viewing the scenery through "clean, fresh" air is one of the most important attributes desired by wilderness users. Visibility impairment is caused by a variety of sources and pollutants can severely impact the ability of users to view the spectacular scenery in Colorado. These same pollutants can also adversely impact aquatic ecosystems found at high elevation locations and have negative impacts on their "naturalness". Unfortunately, Colorado, along with a few other states, does not currently have strong enough regulations to control emissions from many air pollution sources. And to date, the tourism industry has also not been actively involved in either the regulatory arena, where such regulations can be developed, or in informing the public as to the magnitude of the threats and possible solutions. This presentation identifies the air pollution threats to wildernesses and other scenic areas in Colorado and some potential solutions that tour operators and tourists in these areas may want to support. It also addresses proposals currently being developed by the Western Regional Air Partnership to control air pollution sources in and near selected wilderness areas and National Parks.

#### **Chris Lane**

Director of Environmental Affairs Aspen Skiing Company

Abstract Title: Sustainable Tourism: Corporate Environmentalism in the Mountain Resort Industry

Aspen Skiing Company (ASC) knows that a healthy environment is integral to business success. We are committed to improving our environmental performance and to supporting causes that protect the environment. We believe that business is more than just a way to make money: it's also a way to improve the world.

ASC's environmental endeavors can generally be divided into three categories: 1) what we do internally to reduce the impact of our day-to-day business operations; 2)

what we do to develop the most environmentally-sound operations on our four mountains; and 3) what we do to support and promote environmental protection, activism, and preservation of this region of Colorado.

Currently, we are pioneering several innovative ways to take steps toward sustainability as a resort. The foundation for this direction is manifested through our Guiding Principles, a document that makes a public declaration of our values as a company. For example, this document supports the idea that there are limits to growth. From this genesis are derived our broad-based environmental programs with the goal of designing and operating a resort that protects natural resources, reduces its environmental impact, and saves money along the way.

Through our first-of-its-kind Pollution Prevention partnership with the Colorado Department of Public Health and Environment, we are cooperatively developing an environmental management strategy that focuses on energy, water, and waste in resort operations. Through our green development guidelines, Building Sustainable Resorts, Guidelines for Environmentally Sustainable Design and Construction of Aspen Skiing Company Facilities, we are developing buildings that reduce environmental impact, improve worker health, and reduce consumption of natural resources. And we created the industry's first Environment Foundation, a non-profit employee environmental organization that works to protect the regional environment.

Individually, these are small steps in the long road to corporate and resort sustainability, but collectively we are finding that these programs have substantial, quantifiable benefits to the environment, the community, and the bottom line.

#### Panel: Managing Recreation Use: Tools and Techniques for Making it Work

#### Tom Christensen

Manger of Planning Land Between The Lakes National Recreation Area

Abstract Title: Carrying Capacity - Spread The Load?

As public land management agencies look to the future, the issue of carrying capacities for the increasing demand for recreation uses on these public lands, may require a broader look at the capacity of an entire region to manage leisure oriented uses, by visitors and residents alike.

Can a regional examination of recreational and tourism uses and an integrated plan of use by a broad band of land operators in a region, lead to spreading uses out on the landscape to better manage the capacity for use without detrimental impacts on the environment?

The Tennessee Valley Authority at its Land Between The Lakes National Recreation Area (LBL), a national demonstration project, is currently working with group of regional representatives to examine how an entire region might work together to plan a sustainable future for recreation/tourism uses. This regional vision of the future might then allow the public lands in the region to better ascertain carrying capacities for the public lands in the region. The public lands in the region include 1 national recreation area, 1 national battlefield, 3 national wildlife refuges, 5 state parks, and numerous county and city parks.

This ongoing project involved the preparation of a Regional Tourism Plan for the 2 states (Kentucky and Tennessee) Lakes Region surrounding LBL. The project involves tourism groups in 21 counties, over 30 cities/towns, public lands agencies, and conservation organizations.

The plan developed for the region suggests that the existing water based recreation foundation would be augmented by new tourism capacity in all 21 counties for wildlife, heritage and trail related activities. This combination is believed to offer the best match for the region's tourism market while at the same time offering quality of life benefits to residents. Tourism development in the areas of wildlife habitat, heritage preservation and trail development also represent less impact on the region's environment.

The Lakes Region Tourism Coalition has been formed to be the implementation organization to work with private and public organizations. The theme for the region is "The Land of 10,00 Trail". Coalition committees are currently at work on a regional customer information system, new tourism legislation, major hike and bike trail system development, new web page promotions, and trail planning for a wide variety of wildlife, heritage, and water based activities.

#### **Robin Fehlau**

Bureau of Land Management P.O. Box 7 Monticello UT 84535

Abstract Title: Cedar Mesa/Grand Gulch Plateau Backcountry Permit System

Cedar Mesa/Grand Gulch Plateau Backcountry Permit System. Cedar Mesa has long been identified with world class Ancestral Puebloan cultural remains and excellent day hiking and backpacking opportunities. Grand

Gulch itself has been managed to protect these cultural and primitive recreation values since 1970 when the Secretary of the Interior designated it as a Primitive Area. The other canyons were protected within the Cedar Mesa Area of Critical Environmental Concern in the 1991 San Juan Resource Management Plan (RMP). In recognition of increasing recreational visitation and declining resource conditions, the BLM developed the Grand Gulch Plateau Cultural and Recreation Area Management Plan in 1993. This plan called for a permit system for Grand Gulch, although it did not give a date for implementation of this system. In 1991, individual self-serve permits, advanced reservations for pack stock and larger foot parties, and fees were first established for Grand Gulch. As recreation use of this very popular area, and the surrounding canyons, continued to increase, crowding during peak times of the year became a problem. In 1997, BLM posted signs at the trailheads letting users know that a reservation/permit system would be put in place for all Cedar Mesa area users by 1998. Due to budget and personnel restrictions the permit system was not implemented until 1999 (BLM changed the trailhead signs to reflect this). The system has enacted includes both commercial and private users in a trailhead allocation for eight canyons (eleven trailheads). It was anticipated that this reservation and permit system would help minimize impacts on the fragile cultural resources while enhancing the visitor experience. This oral presentation will cover why and how BLM determined the area needed a reservation system, what type of system was implemented, reflections on the first year s successes and failures, and likely changes for next year.

#### **Roxanne Martin**

Policy Planner Jefferson County Open Space 700 Jefferson County Parkway, Suite 100 Golden, Colorado 80401

#### Dr. Glenn E. Haas

College of Natural Resources Colorado State University Fort Collins, CO 80523

Abstract Title: The Evolution of Jefferson County Open Space Program Towards a Carrying Capacity

Jefferson County is a well-endowed and progressive area on the western edge of Denver and extending west into the foothills of the Rocky Mountains. In 1972, the citizens voted to tax themselves to preserve their open space and thus created the Jefferson County Open Space Program (JCOS). Both the program and population have flourished over the years, to the point where concern about user conflicts on the trails and resource degradation prompted an examination of the system's carrying capacity. The JCOS staff initiated a project to "develop" carrying capacities in the Fall, 1998, but soon realized that several fundamental voids existed and changes were needed.

This presentation discusses the evolution of this project and highlights several major changes accomplished as a prerequisite to meaningful carrying capacity discussions: 1) developing three area management directions (also referred to as prescriptions or zones) which provide more guidance and link the broad JCOS Master Plan with park level management plans, 2) developing an internal management planning process so that each functional staff group within JCOS is integrated into the decision-making, and 3) developing a structure for management plans so that the documents themselves are clear, easy to reference, integrated, include objectives and standards, specify actions, and allow for budget justification and accountability. In addition to this project preparing us to deal with the carrying capacity questions, it has also helped us internally to develop a shared philosophy, terminology, understanding of process, integration across functional staff groups, and team-spirit.

#### Karen M. McKinlay-Jones

Arches National Park Visitor Use Management Project: National Park Service P.O. Box 907 Moab, UT 84532

Abstract Title: Arches National Park Visitor Use Management Project: What Do We Do Now?

This presentation will give a brief history of the Visitor Experience and Resource Protection Framework (VERP) at Arches National Park and how it relates to visitor use management park service wide. The presentation will describe how visitor use standards were set for front country sites using the VERP process and how monitoring is currently being accomplished. Most of the discussion will focus on what has been learned thus far through the project and what questions remain.

**Craig Taggart** Senior Associate EDAW, Inc.

Abstract Title: Bighorn Scenic Byway Corridor Management Plan

Located on the "Passage to Adventure" (a cooperative program involving five national forests and grasslands) between the Black Hills and Yellowstone National Park, U.S. Highways 14, 14A and 16 in Wyoming's Bighorn Mountains were designated as Forest Service Scenic Byways in 1989. These highways, and the sensitive and scenic lands they cross, have attracted an increasing national and international audience in recent years. As a result, a variety of management issues have arisen that have prompted the call for a comprehensive corridor management plan. Among these issues are visual resources (e.g., resource utilization vs. protection), recreation (visitor use, expectations, preference, and carrying capacity), interpretation (effectiveness and opportunities), highway operations (inter-agency conflicts - safety vs. scenery) and local community-Forest economic interrelationships.

Through the course of this year and a half study, six distinct public preference surveys were administered, including the following: Winter Recreation, Community, Summer Visitor, Summer Campground, Visual, and Highway Operations surveys.

Among the specific recreational issues addressed in the various surveys are public preferences regarding the level of service, scale of development, recreational setting, and expectations related to fees and level of development in campgrounds. Perceptions regarding the roles of government and the private sector, crowding, and recreation use conflicts were also addressed.

While confirming the results of other regional and national recreation surveys in many ways, some new and surprising results regarding visitor preferences were obtained. In addition, the insights provided through the survey efforts have resulted in tangible management solutions to many of these ongoing issues. Both the practical solutions developed in response to these surveys and some of the unexpected results of these surveys are worthy of broader exposure and discussion.

#### Gene W. Wood

Professor School of Natural Resources Clemson University Clemson, South Carolina

Abstract Title: Adaptive Management for Trail Systems

Adaptive management is a paradigm in which citizens (the users and owners of publicly owned natural resources), managers and scientists assemble their collective values, knowledge and wisdom to create and implement management strategies.

The process begins with recognition that: a) ecosystems are constantly changing, b) knowledge of ecosystems is constantly changing, and c) human values for ecosystems are constantly changing. Recognition of these dynamics forms the foundation for the logic that management strategies must be flexible and adaptive in time and space.

The most important product of adaptive management is knowledge. Managers not only implement knowledge, they also produce knowledge in the management process, and share it with citizens and scientists. Scientists develop the strategies for acquiring new information, analyze that information, and share that knowledge with mangers and citizens. Citizens learn the fundamental aspects of management, the forces that constrain the process, and the science upon which it is based. In addition, they teach managers and scientists about their perceptions, perspectives and values. Collectively, these three entities come together to reach agreement on what it is that: a) they need to know in order to manage natural resources for a sustainable human benefit; b) what they do know as a result of scientific research and experiential documentation; c) what they believe that they know based on anecdotal information and reasoning, and d) what they need to know but of which they have no knowledge.

Adaptive management integrates the thinking and values of the citizens, the agents of their government, and intellectual capital in their universities. It is the essence of conservation in a democratic and capitalistic society.

The Clemson Experimental Forest Trail System Planning Process will be the example used to illustrate adaptive management planning for a shared-use trail system.

#### Panel: Models: A New Paradigm

William L. Bryan, Jr., Ph.D President Off the Beaten Path, LLC 27 E. Main Street Bozeman, Montana 59715

Abstract Title: Private Enterprise, Outdoor Recreation, and Resources Capacity: A New Paradigm

My presentation builds on the following premises: that public lands will remain public; that public lands have a limited capacity for quality outdoor recreation; that such limits have only begun to be addressed in the public policy arena; and that private enterprise rarely takes the lead in such discussions and frequently sees them as a threat to business. The view is taken that those private enterprises who utilize public lands in their endeavors need to play a leadership role in developing land and marine policies that embrace the concept of limits and carrying capacity and that such an approach, in most instances, tends to favor business practices, not hinder them.

To further these thoughts, a survey has been done that analyses the roles that private industry has played regarding three different public land entities where issues of resource capacity have become significant—Yellowstone National Park, Sawtooth National Recreation Area, and Grand Canyon National Park. Findings will be used as a baseline to develop and propose a new mindset or paradigm on how the private sector might best approach resource capacity issues in a constructive and profitable manner. The presentation will explore why public lands recreation has had a long history of being an extractive recreation endeavor and how this must change to where public lands recreation becomes a renewable resource activity.

The presentation offers some specific ways this basic change may come about.

Specific examples will be described to highlight these points utilizing Yellowstone, the Sawtooths, and Grand Canyon as cases in point.

The presentation will conclude with the belief that private industry involved in public lands recreation can and should be proactive in changing tourism from an extractive industry to a more renewable and sustainable endeavor. A key ingredient to such a change is to creatively embrace and help define resource capacity issues and solutions concerning public lands and marine resources. And, furthermore, the conclusion will try to validate the hypothesis that blending public and private needs and responsibilities can be profitable, sustainable, ecological, and equitable.

#### Kenneth Chilman

Southern Illinois University at Carbondale

#### John Titre Colorado State University

Colorado State Oniversity

James Vogel Colorado State University

#### Greg Brown

Alaska Pacific University

Abstract Title: A Decision Oriented System for Recreational Carrying Capacity Management

Changes in capacity decision conditions during the past decade have necessitated changes in capacity determination processes. Early capacity study processes took several years and were expensive to implement (Stankey et al. 1985). A Corps of Engineers carrying capacity program on 18 lake areas since 1992 has devised shorter-term, less expensive approaches. These approaches are now being applied on river and wilderness areas.

Recreational carrying capacity research focuses on helping recreation area managers make decisions about changes occurring on large management areas. The changes may be overall increases in use for an entire management area, or changes occurring or proposed on specific parts of the area. Managers need systematically collected data, especially social data, about existing conditions at specific places as a basis for capacity decisions (Washburne 1982).

The Corps research program took the management planning process outlined by Manning (1985) and focused on social aspects of the inventory step of the process. Management subunits with differing characteristics were identified within the total management area, and then social data (visitor counts and interviews) were systematically collected and analyzed by subunit to provide an overview of conditions for the management area. Using the recreation opportunity spectrum concept (Manning 1985), objectives for management and corresponding capacities are determined.

For decisions related to issues at specific places (including proposals for development), data collection can sometimes focus on those places, with shorter time frames. For decisions with longer time frames, a system of remeasurements (monitoring) over a longer period of time can provide very useful information about rate of growth or other changes in recreational use. These systematic social data collection options have enabled managers to have a better information base and a much more confident response to specific capacity issues.

#### **Steve Hinchman**

Director Western Slope Environmental Resource Council Box 1612 Paonia, CO 81428

Abstract Title: Innovative Approaches to Increasing Outdoor Recreation Demands on National Forest Lands in Western Colorado.

Beginning in the late 1980s, western Colorado National Forests started seeing rapid, sustained annual increases in Hunter Visitor Days. Almost a decade later, consequences of these high growth rates have became wide spread and are raising issues of recreational carrying capacity among all forest stakeholders. This slide show documents case studies showing ramatically increased hunting season use between 1986 and 1996, and a variety of resulting impacts -- ranging from loss of hunting quality, to loss of recreation business, to reduced big game productivity, to damage to natural resources, to impacts to other forest users.

The second part shows one community's attempt at a collaborative solution to the problem through stakeholder meetings and field trips leading to development of a hunter education brochure, road closures and reclamation, signage, and fostering of a peer stewardship ethic. Some initial response from affected hunting publics are included.

#### **Roz McClellan**

Coordinator, Rocky Mountain Recreation Initiative 1567 Twin Sisters Rd. Nederland, CO 80466

Abstract Title: Recreation Capacity Models in the Southern Rockies

Faced with population pressures and recreational demand, land managers in the Southern Rockies at the municipal, county and federal level have developed a number of innovative approaches to establishing capacity standards for recreational use. Drawing on the biological and conservation sciences, land use planners are exploring options for preserving a mix of recreational opportunities while planning for long-term landscape health. The dual goals of protecting the region's habitat and rural back country character while accommodating recreational expansion will call upon the deepest well-springs of human ingenuity and adaptability.

This talk will give an overview of the more promising recreation capacity models being developed in the Southern Rockies region, including case studies of some of the more creative methods used by land management agencies, conservation organizations and recreation groups to address questions of personal freedom versus regulation, the needs of wildlife and the needs of humans, and the use of education, userexperience research, and recreation facility design as tools in establishing recreation levels.

The talk will identify common themes and possible future directions for recreational planning projects being undertaken by federal and state agencies, conservation and recreation organizations and by recreation and wildlife experts in addressing recreational needs in the Southern Rockies.

#### Patricia A. Stokowski

Associate Professor School of Natural Resources 352 Aiken Center University of Vermont Burlington, VT 05405

Abstract Title: The Social Construction of Recreation Resource Capacity: Implications for Community Impacts Assessment

A basic premise of contemporary carrying capacity debates is that a threshold level of visitation exists in recreation settings, and beyond a given ideal point or range, visitors' on-site experiences are diminished and the resource suffers degradation. This approach to understanding capacity relies primarily on theories of social psychology that focus on individuals and their experiences of places. This paper argues, in contrast, that "capacity" is a social construction, and that discussions about carrying capacity relative to public outdoor recreation settings must necessarily incorporate broader sociological theorizing about relationships between and among individuals and groups, and across time and space.

This paper has three goals. First, a constructionist approach is adopted to demonstrate that the concept of capacity has multiple and potentially conflicting meanings (including human numbers, perceptions of others and of space, structural capability, and others) to different sets of social actors even within the same social system. Second, the notion of *community* is applied to examine how multiple capacities may exist simultaneously relative to a given resource setting and its management activities. In contrast to common geographic definitions of community, this discussion relies on an understanding of community as a network of interconnected relationships based on sentiment and shared interaction – a definition that includes not only residents of towns and cities that are adjacent to or near recreation resource places, but communities that form onsite at resource places or even those that may be imagined or sustained across distance. Since this definition of community may suggest new ways to view capacity issues, a third goal of the paper is to discuss specific types of community-level social and economic impacts that may occur as a consequence of resource management decisions. Communities of people may be differentially affected by

policy shifts at resource places, so planners, managers, and researchers are challenged with the task of linking on- and off-site actions and outcomes. This is a complex endeavor, given current practices of socio-economic impact assessment.

Beyond investigating the basic theoretical foundations of the carrying capacity debate from a sociological viewpoint, this paper contributes to the discussion of capacity by focusing on the consequences of resource area management decisions and actions for communities. Examples from the researcher's recent work in several rural, resource-dependent communities and forest resource areas are included to illustrate the arguments. The practical outcomes of this analysis relate to resource and community planning: What kinds of impacts should be considered in evaluating capacity under a broader definition of community? What kinds of linkages between communities and agencies might facilitate stronger support for capacity guidelines? What alternative forms of community structure might support capacity management strategies, and what research must be undertaken to fully understand the regional consequences of resource management practices?

#### Panel: Motorized Recreation Capacity of Public Lands: Are we There? Fact or Fiction.

**Don Amador** Blue Ribbon Coalition 555 Honey Lane Oakley, CA 94561

Abstract Title: "People Management is Resource Management" Signing as a Strategy in the Carrying Capacity Matrix of Public Lands

As resource professionals address greater demands by the public for trail-oriented recreation on federal and state lands, the concept of "people management" must become part of the resource manager's lexicon. Historically, some federal agencies were primarily focused on extractive industrial use of public lands with recreation being simply a sidebar responsibility. As recreation management becomes a central theme, land managers must recognize that people management is resource management. The recreational public often has limited amounts of time to enjoy and explore our forest or desert lands.

This presentation illustrates the tools of people management pertaining to trail-related activities. Agencies should do a serious evaluation of their current signing program. Areas of study should include staging areas and campgrounds, the trail system, and habitat protection or other information programs. A quality "people management" program benefits both the public and the environment.

#### Adena Cook

Public Lands Director BlueRibbon Coalition

Abstract Title: Capacity Concepts Should Keep Pace with Technology

In order to manage recreation resources and properly address capacity, it is important to first understand the values of the recreationists using the resource. Motorized recreationists enjoy many of the same attributes of the back country as wilderness enthusiasts, such as beautiful scenery, challenge and a sense of exploration, solitude, and sharing the activity with a few friends or family.

These attributes are guaranteed by the Wilderness Act. However, the Wilderness Act excludes motors and mechanized transportation. The motorized recreationist does not view his mode of transportation in conflict with his backcountry experience, but rather an enhancement of it. Technological advances since the Wilderness Act have changed and improved backcountry recreation for many.

However, the non-motorized user equates scenery, challenge, and solitude with an absence of motors - and technological advances. These opposing values strongly influence capacity management.

If we update the Wilderness influenced concept of backcountry recreation to match technological advances to accept motorized and mechanized recreation along with solitude, scenery, and unconfined adventure, then conflict will be much diminished. This will be difficult, since decades of indoctrination have reinforced the perceived incompatibility of motorized and non-motorized recreation.

Capacity evaluations need to be site specific. Localized resource considerations should be matched with the specific mix of users in a particular area. However, a coordinated national effort to improve tolerance will benefit all site specific efforts. **Tom Crimmins** Trails Consultant Coeur d'Alene

Abstract Title: Motorized Recreation Capacity - A Moving Target

When one discusses the "recreation capacity", of an area or facility, it is important to differentiate whether the capacity is based on physical, environmental, or social considerations. The final numbers will be different for each case.

Determinations of recreation capacity for motorized or non-motorized users must be based on full consideration of the agency management objectives for the area or facility. Agency management activities can also have a significant effect on the final determination of a recreation capacity. For example, if a capacity is based on the physical size of a facility, it may be possible to increase the capacity by expanding the limiting feature. If the limitations are environmental, capacity may be increased by effective maintenance or improved facility design. In areas where capacity is constrained by social issues such as "conflict" it may be possible to increase the potential capacity by restricting or redirecting the more intolerant individuals to other areas that better meet their needs.

#### Eric J. Lundquist

Senior Legislative Affairs Specialist American Motorcyclist Association Government Relations Department 13515 Yarmouth Drive Pickerington, OH 43147

Perception in some quarters maintains that offhighway recreational use of motorcycles and all terrain vehicles markedly increased during the 1990s. This presentation explores this perception using demographics available from several sources. While we do find that the design of the vehicles and the character of the lands on which the use takes place have changed over the past decade or so, actual usage has remained reasonably flat.

#### Panel: So You Say Education Will Solve Your Problems? Lessons from the Back and Front Country

#### Frances K. Gertsch, HBOR, BA

Masters of Environmental Studies (Planning) School of Planning Faculty of Environmental Studies University of Waterloo Waterloo, Ontario, Canada.

#### Dr. Roger Suffling, Ph.D.

Associate Professor School of Planning Faculty of Environmental Studies University of Waterloo Waterloo, Ontario, Canada.

#### Dr. Paul Eagles, Ph.D.

Professor Department of Recreation/School of Planning Faculty of Applied Health Studies/Faculty of Environmental Studies University of Waterloo Waterloo, Ontario, Canada

Abstract Title: Effectiveness of Interpretive vs. Regulatory Signage for Closing Wilderness Campsites

As use of wilderness parks and protected areas for recreation has increased, managers have been under increasing pressure to protect the ecological integrity of these areas while providing more recreational experiences (Payne & Graham, 1993). This currently protected wilderness must be managed.

Quetico Provincial Park is a wilderness class park of 475,819 hectares in Northwestern Ontario, 160 kilometres west of Thunder Bay and south of Atikokan. Established as a provincial park in 1913, Quetico is renowned for wilderness canoeing opportunities. The park's varied ecology and landscape provides between 1600 and 2000 campsites in the interior wilderness zone. The more accessible of these wilderness campsites receive some of the most intensive visitor use in the park. This use needs to be managed to balance the maintenance of ecological with recreational use of these sites.

This research will evaluate compliance rates for wilderness campsite closures in Quetico Provincial Park and will determine visitor perceptions of campsite closure techniques used, and of the strategy of closing wilderness campsites to reduce site impact. Additionally, this research will determine the barriers to closing wilderness campsites within the Ontario Provincial Parks context. The results will be used to develop a decision-making model for closing wilderness campsites in Quetico Provincial Park that is based on visitor behavior, campsite condition, campsite status, campsite accessibility, and the reason for campsite closure. The model will assist park staff in the field with daily campsite management decisions; and will provide a tool for making strategic management decisions in remote wilderness environments. This research is based on the premise that maintenance of the status quo of wilderness camping experiences in Quetico Provincial Park requires active management of wilderness campsites and that campsite closure, using both signage and educational techniques, is one such management option.

#### Matt K. Jones

Open Space Planner

#### Stacy McColgan

Public Information Coordinator

Abstract Title: Use of minimum impact education, as one means of managing increasing visitation on municipally owned open space

The City of Boulder, Colorado has one of the finest examples of municipally owned open space in the western U.S. While open space provides unique recreation opportunities for city residents, high use levels threaten fragile resources and the recreation experience of open space enthusiasts. Currently, the City registers 1.7 million annual day use visits on 80 miles of designated trails within the 29,000 acres that comprise the open space system. Minimum impact education was seen as one way of accommodating increasing public use while protecting the resource and related visitor experiences. City of Boulder Open Space partnered with Leave No Trace, Inc. to assess the effectiveness of a Leave No Trace on Open Space pilot program specifically designed to address visitor impacts on municipal open space areas.

Three research elements were used to measure and improve program effectiveness: 1) focus groups were convened to refine programmatic content prior to implementation, 2) trailhead contact logs were used to track 1,700 educational contacts, 3) a post-campaign assessment survey of 630 randomly selected visitors was conducted to determine program effectiveness. The results of the survey confirmed a significant increase in awareness of minimum impact techniques after exposure to the program. Outreach mechanism effectiveness was also assessed.

## Maria Thi Mai

Oregon State Parks

Abstract Title: Cell Phone Naturalists and Beanie Babies: How Technology and Pop Culture Influence Parks and Recreation Management

From campgrounds with cable TV hookups to watch the evening news in your 60 foot motor home to buying playground equipment through Beanie Baby sales the landscape of the American outdoor recreation experience has redefined our business practices. This presentation explores how technology has come out of the woods or into the woods as the case may be to manage natural resources in the 21st century.

We ask questions such as how do trends in pop culture alter visitor expectations and ethics, and how do we temper expectations within the carrying capacity of finite resources and dilapidated facilities. We will journey into systems thinking and the science of chaos for what it teaches us about how our institutions self-organize amidst the chaos of new technology and pop culture.

#### David Mensing

Box 27115 Santa Fe, NM 87502

In 1996, a partnership between the Bureau of Land Management and the Public Lands Interpretive Association resulted in the development of the Public Lands Interpretive Center in Santa Fe, NM. This one-stop interagency information center was designed to provide information about public lands on both federal and state jurisdictions. As the center expanded, a proposal to develop a web based version of the site led BLM and the Association to launch a project to provide interagency recreation information on all western states. The site went online in August of 98 with New Mexico, and is being followed shortly by Nevada, Arizona, Wyoming, Utah, Colorado, and the remaining western states. (The web address is: www.publiclandsinfo.org) The site presents information in a consistent format on a state by state basis. Features include a searchable data base, a full service bookstore, news, calendar of events, educational opportunities, comments, weather, road conditions, links, agency missions, and a public lands museum. The site includes many clickable maps, and many user driven features. The site is developed in cooperation with the federal and state agencies involved with the site, is updated and verified on a continual basis, and is operated by the cooperating association. BLM provided the initial startup funding with the site funded through profits generated from sales in the bookstore.

Information systems such as this are critical to providing users with accurate information about what to expect when they are planning a trip or when they show up on site. Helping the agencies manage use is one of the important missions of these information systems. By providing information on crowding and times when use is lower and providing accurate information on other use areas helps distribute use away from over crowded areas.

It would be my intent to provide a demonstration of the Public Lands Information Center web site and enter into a discussion on how to use the site and sites like this to address the recreation capacity issues. I would be able to provide the hardware to conduct a demo at any location with electricity.

#### Karen Stimpson

Executive Director Maine Island Trail Association (MITA)

#### **Steve Spencer**

Outdoor Recreation Specialist Maine Bureau of Parks and Lands (BPL)

The Maine Island Trail Association, a nonprofit conservation organization established in 1987, unites individuals, organizations, and the State to monitor, manage, and protect 48 undeveloped, wild public islands off the Maine coast. MITA's mission is to "establish a model of thoughtful use and volunteer stewardship for the Maine islands that will assure their conservation in a natural state while providing an exceptional recreational asset that is maintained and cared for by the people who use it."

Recent increased use poses a serious threat to the sustainability of Maine's island ecosystems, the social experience of island visitors, and economic benefits of this resource. In response, MITA and the BPL have begun to develop short- and long-term management plans and have initiated dialogue with island users and other stakeholders through public forums.

The concerns, ideas, and questions raised by MITA and the State echo those of the Congress: how do we effectively manage the *public* as they use *public* lands? On the 325 mile-long Maine Island Water Trail, management problems are compounded by the inability to enforce strategies or regulation. Fostering cooperation among all users toward voluntary self-limitation has become our strongest, and most daunting, option. As a presenter at the November conference, MITA would share Maine's island usage dilemma and the success of our management strategies.

MITA and BPL's collaboration with concerned island stakeholders (kayak outfitters, conservation organizations, coastal residents, etc.) has resulted in recent action steps: increase the resource (add mainland overnight alternatives such as campgrounds/B&Bs); modify user behavior (educate users about low impact practices and post voluntary use guidelines about group size/length of stay); and limit use (close all or part of an endangered island; post voluntary capacity limits on each island).

The key problems facing the Maine islands represent a microcosm of public island issues nationwide. We would be delighted to join in this nationwide discussion and exchange of management strategies.

#### Panel: Factors Influencing Visitor Use, Perception of Crowding, and Acceptance of Capacity Limits: Views From National, State and Local Recreational Facilities

Aria Brissette Research Assistant Colorado State University

**Dr. Glenn E. Haas, P.h.D.** Professor Colorado State University

#### Marcella Wells, P.h.D.

Assistant Professor Colorado State University

Abstract Title: The Public's Support of Various Justifications for Recreation Capacity Limits

Soaring numbers of visitors to our State and National Parks, Forests, Recreation Areas, lakes, and reservoirs are making it increasingly difficult for our federal and state land management agencies to provide quality recreational experiences and sustain natural resources at the same time. This has raised the question of how many people are too many people. Agencies in charge of managing recreation are often hesitant to implement capacity limits because they fear the public will neither support nor comply with these recreational limits. Explaining to the public why a recreation limit has been set at a particular area is an important step in gaining their support and compliance with the policy. This study examined what amount and form of public support is out there for capacity limits. There are several justifications that land managers can use to explain to the public why they have chosen to set a capacity limit, and from these, eight broad categories have been identified from which justifications can be based. These categories are: 1) public safety, 2) sustainability for future generations, 3) natural resource limits, 4) infrastructure limits, 5) quality of visitor experience, 6) existing regulations, 7) agency capability, and 8) cultural/lifestyle preservation.

Visitors were surveyed at three campgrounds within the Arapaho National Recreation Area during the summer of 1999. One of the objectives of this study is to rank the eight categories above on a scale, ranging from "least acceptable to the public" to "most acceptable to the public". Determination of the level of public support for these rationales will provide information that managers can use to develop more effective messages in their efforts to change negative public attitudes and perceptions of capacity limits. The results of this study will be presented at the Congress.

#### Walter F. Kuentzel, P.h.D.

Associate Professor University of Vermont

#### Thomas A. Heberlein, P.h.D.

Professor University of Wisconsin at Madison

Abstract Title: Changing Visitor Composition and Perceived Crowding Across 22 Years at the Apostle Islands National Lakeshore: Tracking a Moving Target

This study analyzes changing crowding perceptions among boaters at the Apostle Islands National Lakeshore using longitudinal data from 1975, 1985, and 1997. The number of overnight boater visits increased from just over 7000 in 1975 to nearly 16,000 in 1985, but have remained roughly the same since the mid 1980s, yet the 1997 boaters felt more crowded than the 1985 boaters. Since use levels at the Apostle Islands are not related to perceived crowding, what has changed about the visitors to the Apostle Islands that make them evaluate crowding so differently? This study used a structural equation model to investigate how the 3 cross sections differed in their socioeconomic characteristics, perceptions, and behaviors.

The results showed unique characteristics and patterns of response between each sample. Our analysis showed an aging population of boaters in 1997. The average age in 1975 and 1985 was roughly 36 years old, while the average age of boaters in 1997 was 44. Typically, older boaters feel less crowded. However, this was not the case among the older 1997 boaters. The results showed that the 1985 boaters were more likely than boaters in other years to either a) prefer more than 6 encounters with other boats while anchored, or b) to have no stated contact preference. These 1985 boaters with either high contact preference or no contact preference were less likely to feel crowded. The results also showed that boaters with more experience at the Apostle Islands in 1975 and 1985 felt more crowded. However, more Apostle Islands experience in 1997 did not predict crowding. These data show how visitor composition within a single activity can change dramatically over time, and that these changes can mean significant shifts in visitor evaluations of their experience. These findings suggest the necessity for longitudinal monitoring of normative standards from which carrying capacity estimates are established.

#### Daniel D. McLean, P.h.D.

Associate Professor Indiana University

#### Joel Meier, P.h.D.

Professor and Chair Indiana University

Abstract Title: Measurement of Use in the State Parks

America's state park systems represent an important and diverse component of the outdoor recreation estate that comprises 5,870 areas totaling 12.7 million acres. The 761 million visits to state parks reported in 1997-98 was second only to that reported by the US Forest Service in 1998, yet the state park estate is only 6 percent the size of the Forest Service areas and 1.9 percent the size of all federal outdoor recreation areas. This suggests that state parks may receive an inordinate amount of use in comparison to their size when compared to the federal outdoor recreation estate.

The measurement of park usage varies among the state park agencies, with differences in the emphasis given to data, fiscal capability, and expectations of legislative bodies. The National Association of State Park Directors has been collecting statistical data from state park directors and researchers annually since 1979 and disseminating it via the Annual Information Exchange (AIX). The AIX tracks changes in 7 areas: 1) inventory of areas; 2) types of facilities; 3) visitation and use; 4) capital improvements; 5) financing; 6) personnel; and 7) support groups. Data gathered by the AIX pertaining to participation (day and

overnight), financing, types of areas, size of areas, and density of use across a 2 0 year period was submitted to a trend analysis to identify changes in the state park estate and it use, and to compare it to comparable data from National Parks.

The ongoing changes in the size and composition of the state park estate and the density and shifting patterns of state park use provide a graphic depiction of the changing contributions of the state park estate to total capacity. Recognition of the evolving contributions of the state parks is critical to our understanding of recreation and resource capacity.

#### Howard E. A. Tinsley, P.h.D.

Assistant Professor University of Florida

#### Diane J. Tinsley, P.h.D.

Research Scientist University of Florida

Abstract Title: Older Adults' Perceptions of the Constraints and Benefits That Influence Their Use of a Large Urban Park

This research examines the constraints and benefits that influence the use of Lincoln Park in Chicago by residents who are 55 years of age or older.

Lincoln Park, Chicago's oldest, most heavily used park provides lakefront access and diverse cultural and recreational opportunities to over 20 million visitors annually. The majority of park users are Caucasian, and the typical users are college student and young persons employed in white-collar occupations. This pattern of usage runs counter to changes occurring in the demographic composition of American society, which is becoming increasingly older and more ethnically diverse. Recent estimates suggest that over 90% of the population over age 65 (and 33% of the men and 66% of the women aged 55 to 64) are not working. At the present time the older. increasingly ethnically diverse American population has more discretionary time than ever before, but surprisingly little attention has given to the factors that influence their use of recreational facilities such as urban parks.

Data were obtained from approximately 50 male and 50 female residents of Asian, African, Caucasian, and Hispanic/Latino ethnic heritage. Each person was engaged in an activity in Lincoln Park at the time of data collection. Participants completed a structured interview about the social milieu within which their participation in Lincoln Park occurs, the constraints and barriers that influence their use of the park, and the psychological benefits they experience from using the park.

The data were analyzed to determine the influence of these factors on the park usage of older residents. The possibility of gender or ethnic differences in the perceptions and use of the park are examined. Implications of the results for encouraging greater use and enjoyment of large urban parks by a larger and more ethnically diverse cohort of older residents are explored.

#### Jerry J. Vaske, P.h.D.

Professor Colorado State University Department of Natural Resource Recreation and Tourism Human Dimensions in Natural Resources Unit Fort Collins, Colorado 80523

#### Maureen P. Donnelly, P.h.D.

Associate Professor Colorado State University Department of Natural Resource Recreation and Tourism Human Dimensions in Natural Resources Unit Fort Collins, Colorado 80523

Abstract Title: Generalizing the Encounter, Crowding, Norm Relationship

The concepts of recreation encounters, crowding and norms have received considerable empirical attention. Recreation encounter measures describe the number of other visitors an individual remembers seeing during a trip or at a given location (e.g., campsite, on the trail or river), while crowding is a negative evaluation of those encounters. Norms are defined as evaluative standards regarding acceptable behaviors or conditions in a given context. Theory predicts that when encounters exceed a visitor's tolerance limit (norm) for seeing others, crowding will increase. This paper examines this relationship using data from 10 different studies conducted across the United States and Canada. The activities included hunting, rafting, kayaking, canoeing, tubing, motor boating, sailing, rock climbing, mountain climbing, backpacking, and day hiking. Study areas were located in Alberta, British Columbia, California, Colorado, Georgia, and Wisconsin. The areas studied also reflected considerable diversity, with some showing extremely high density and use impact problems, and others showing low densities and no problems. Measures of recreation encounters asked respondents to indicate the number of people they remembered seeing in different contexts. Crowding was measured using a 9-point Likert scale ranging from 1 "Not at all crowded" to 9 "Extremely crowded." An indicator of the individual's tolerance norm was obtained by asking respondents to specify the highest number of encounters they would tolerate for a given situation. As predicted by theory, mean

differences in perceived crowding were significantly higher for individuals indicating more contacts than their norm. In general, when the number of encounters was less than the norm, crowding scores averaged 2.00 (i.e., Not at all crowded). When encounters exceeded the norm, the mean crowding scores were 5.00 (i.e., Moderately crowded). By contrasting identical measures of the same concepts across a number of activities, resources, and visitor characteristics, the generalizability of the hypothesized relationship is more readily apparent.

# Panel: Stakeholder Acceptance in Wildlife Management

#### **Dan Decker** Cornell University

Len Carpenter Wildlife Management Institute

Abstract Title: Stakeholder Acceptance Capacity and Biological Carrying Capacity Concepts Applied in Wildlife Management: Similarities and Differences

The concept of wildlife stakeholder acceptance capacity (WSAC) has developed from different perspectives. Despite the "fuzzy" nature of the concept, we have no doubt of its emerging place as a fundamental of modern wildlife management. However, our own experiences and observations of attempts to articulate and apply the concept indicate a need to refine it. The primary needs as we see them include:

- 1. <u>Develop standard measures of WSAC.</u> Lack of standard measures (i.e., indicators of individual, stakeholder group and community tolerance or acceptance of wildlife) diminishes temporal, spacial, and cross-stakeholder comparability of research, thereby impeding development of fundamental understandings of how WSAC actually operates.
- 2. <u>Identify and understand relationships of principal</u> <u>variables that affect acceptance capacity of various</u> stakeholder groups.
- 3. <u>Determine how to aggregate multiple stakeholder</u> <u>acceptance capacities for a particular situation</u>. This is a broad and fundamentally important set of considerations for operationalizing the WSAC concept. Embedded in this need are questions about representation of stakeholders in decisions, differential weighting of various stakes, appropriateness of techniques for gaining stakeholder input to the weighting process, etc.

- 4. Experimentation in manipulating variables influencing <u>WSAC for different stakeholder groups</u> such that wildlife managers can assess efficacy of techniques to modify WSAC (e.g., communication, education, economic incentives, regulations, human behavioral change, public recognition, etc.).
- 5. <u>Understand stakeholder acceptance of techniques</u> that managers employ to influence wildlife populations (e.g., hunting, culling, contraception, poisoning, etc.) or to influence WSAC (e.g., communication, education, economic incentives, regulations, human behavioral change, public recognition, etc.).

These areas of research need will be discussed with emphasis on researcher-practitioner partnerships to ensure utility of findings for actual management application.

#### Larry Gigliotti

South Dakota Fish & Game Department

#### Len H. Carpenter

Wildlife Management Institute 4015 Cheney Drive Fort Collins, CO 80526

#### Dan J. Decker

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Abstract Title: Developing Wildlife Stakeholder Acceptance Capacity Concept: Research Needed

Capacity understanding has been a central driving force in both the biological and human dimensions of wildlife management. The concept of biological carrying capacity has been around for a long time. This concept recognizes that ability of the environment to support a population of animals (usually with reference to habitat for one species) has limits. When these limits are exceeded, usually by a relatively high density of animals, there are consequences to the well being of the animal population and the biotic community in which it occurs. For many years reference has been made to another form of carrying capacity as well, that being the capacity of society to tolerate or accept the impacts of wildlife in particular situations. Attempts to articulate this concept have taken several forms, but all generally recognize the economic or attitudinal limits of society to "carry" wildlife.

We compare and contrast elements of the biological and human dimensions concepts of carrying capacity. Our purpose is to develop a context for the subsequent papers that explore conceptual and practical aspects of wildlife stakeholder acceptance capacity.

#### John Organ

U.S. Fish and Wildlife Service 300 Westgate Center Drive Hadley, MA 01035

#### Mark Ellingwood

New Hampshire Fish and Game Department 2 Hazen Drive Concord, NH 03301

Abstract Title: Stakeholder Acceptance Capacity for Black Bears, Beavers and Other Beasts in the East

The formal concept of stakeholder acceptance capacity (SAC) in wildlife management is less than a generation old. The genesis of wildlife management in North America occurred during a time when populations of many wildlife species were low, their habitats were altered and degraded, and the human population was rapidly urbanizing. The focus of wildlife management was to restore wildlife populations and habitats. Once restored, wildlife managers strove to maintain populations at levels within biological carrying capacities (BCC) and provide benefits to a relatively narrow range of stakeholders. In recent years, cultural changes associated with a predominantly suburban society have led to conflicts with traditional wildlife management approaches, and broadened the stakeholder base. Wildlife managers have had to consider the interests of a wider stakeholder base that supports a diversity of often conflicting expectations, while relying on traditional funding sources. For certain species, management for SAC has taken priority over management for BCC. This scenario is particularly focused in the northeast United States where human population densities are some of the highest in the nation.

We explore the current state of our knowledge of SAC for certain species in the east, and what tools are being used for monitoring and assessment. We discuss the adequacy of these approaches and offer suggestions for incorporating SAC into wildlife management planning and operations. We consider the implications of SAC to the future of wildlife management in North America.

#### Shawn J. Riley

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#### Daniel J. Decker

Professor, Human Dimensions of Wildlife Management Associate Director Cornell University Agricultural Experiment Station Roberts Hall, College of Agriculture & Life Sciences Cornell University, Ithaca, NY 14853

Abstract Title: Lion in the SAC: Risk Perceptions and Wildlife Stakeholder Acceptance Capacity for Cougars in Montana

Management of wildlife stakeholder acceptance capacity (WSAC) for large carnivores is a daunting challenge for resource managers concerned with sustainable coexistence of these species with humans. Recent increases in cougar-human conflicts throughout most of western North America, especially cougar attacks on humans, are an acute example of this issue. Comprehensive management strategies that consider how to influence WSAC provide additional or alternative options to direct manipulation of cougar populations. We used a mail-back questionnaire (n=805) to measure WSAC for cougars in Montana, and to identify factors that contribute to WSAC. A 3-variable model that included perception of cougar population trends, attitudes towards cougars, and risk beliefs associated with cougars, correctly predicted respondents' WSAC 85% of the time. More than 55% of respondents expressed beliefs that risk to human safety posed by cougars was greater than risks associated with commercial airline travel, and 20% believed the risks from cougars were greater than those incurred by automobile travel. Risk perceptions were affected by the extent and type of involvement respondents had with cougars. Nearly 96% of respondents indicated they were interested in wildlife and 52% indicated they actively participated in wildlife-related recreation. Suburban and rural respondents expressed WSAC consistent with each other but different from those among urban and small town residents. Based on our results, WSAC for cougars, and presumably other potentially-dangerous wildlife, can be modified through education, risk communication, and action that affects attitudes toward the animals, perceptions of wildlife population trends, and beliefs about risks to human from wildlife. Discrepancies between public perceptions and the nature and magnitude of risk communicated by "experts" can erode distrust in resource managers and the government. Relevance of our findings to understanding WSAC for other potentially-dangerous wildlife is discussed.

Tania M. Schusler

Graduate Research Assistant Human Dimensions Research Unit Department of Natural Resources Cornell University

#### Lisa C. Chase

Graduate Research Assistant Human Dimensions Research Unit Department of Natural Resources Cornell University

#### **Daniel J. Decker**

Professor and Co-Leader Human Dimensions Research Unit Department of Natural Resources Cornell University

Abstract Title: Community-Based Management: Involving Stakeholders When Tolerance for Wildlife is Exceeded

The success of wildlife management in restoring populations of several species that were rare at the turn of the century has led to new challenges in mitigating problems associated with increased people-wildlife interactions. Often these are situations where the acceptance capacity of one or more key stakeholders has been exceeded. Familiar scenarios include those where concerns about property damage and safety have arisen in communities living in close proximity with deer, elk or geese. The instances where these concerns have reached public issue status and controversy seem to be growing by leaps and bounds.

We suggest that the site-specific nature of most cases where stakeholders' wildlife tolerance is exceeded calls for *community-based management* that emphasizes appropriate kinds of stakeholder involvement. We present cases where the tolerance of some stakeholders for specific species has been exceeded, challenging local communities and wildlife agencies to resolve conflicts among stakeholders with varying acceptance capacities. These cases include elk management in Colorado, deer management in New York State, and colonial-nesting waterbird (e.g., cormorants, Caspian terns) management on Lake Ontario.

We discuss how human dimensions research has informed managers' understanding of two important stakeholder characteristics: (a) acceptance capacities for wildlife and (b) preferences for various kinds of opportunities to be involved in wildlife management decision-making and action implementation. We argue that the "problem" of exceeded tolerance for wildlife can serve as an "opportunity" and motivating force for community action, including co-management, which encompasses a range of community-based involvement possibilities. And, we propose that a local community, such as a town or county, is an appropriate scale at which to initiate cooperative management programs to balance wildlife impacts with acceptance capacity and foster a community's commitment to wildlife conservation.

#### Harry C. Zinn

Assistant Professor Recreation & Park Management Program The Pennsylvania State University

#### Michael J. Manfredo

Professor Department of Natural Resource Recreation and Tourism Colorado State University

#### Jerry J. Vaske

Professor Department of Natural Resource Recreation and Tourism Colorado State University

Abstract Title: The Social Psychological Basis for Stakeholder Acceptance Capacity

Wildlife managers often encounter stakeholder groups with differing beliefs about ideal population levels of wildlife. For example, hunters, farmers, timberland managers, and suburban homeowners often express different preferences for deer populations. Similarly, stakeholder groups often differ over population levels of Canada geese, prairie dogs, beaver, and other species. Understanding and responding to these different preferences is essential to the successful management of publicly-owned wildlife.

Researchers have examined beliefs about wildlife populations from perspectives including overabundance, cultural carrying capacity, wildlife acceptance capacity, risk perception, and normative beliefs. Each approach has contributed to our understanding of how beliefs about ideal wildlife population levels are based on a complex interaction among psychological and situational variables.

From the perspective of social psychology, important psychological variables range from a small set of broad, core values to a much larger set of more specific beliefs, attitudes, and norms. In the context of wildlife management, broad wildlife value orientations have been shown to influence attitudes toward wildlife and beliefs about controlling wildlife populations. Beliefs about wildlife populations also can be influenced by gender, occupation, past experience with wildlife, perceptions of risk, and the beliefs of other people, as well as situational variables including species and the specific nature of encounters.

A normative approach can help describe and explain the psychological and situational factors that influence what stakeholder groups believe about wildlife populations. This can help identify conditions which are likely to generate intense conflict and allow more confident generalization about how stakeholders will respond to different population levels. Continued research will be needed to identify the values, beliefs, and situational specifics that will best predict and explain normative beliefs about wildlife populations across a variety of stakeholder groups, wildlife species, and situations.

#### Panel: Visitor Experience and Resource Protection: Development and Application of A Carrying Capacity Framework for the U.S. National Parks

#### **Robert E. Manning**

Recreation Management Program School of Natural Resources University of Vermont 356 Aiken Center for Natural Resources Burlington, VT 05405

Abstract Title: Visitor Experience and Resource Protection: Development and Application of A Carrying Capacity Framework for the U.S. National Parks

In the early 1990's, the U.S. National Park Service began developing and applying a framework for determining and managing carrying capacity in the national parks. Titled Visitor Experience and Resource Protection (VERP), this framework is designed to define and maintain the quality of visitor experiences and natural/cultural resources in the national park system.

Initial application of VERP to Arches National Park resulted in a comprehensive carrying capacity plan for that park, the first such plan in the national park system. Based on that experience, a handbook on VERP for park planners and managers has been developed, and applications of VERP have been conducted in additional units of the national park system. This session will describe the VERP framework and its application. Session participants will include National Park Service planners, managers, and researchers. Panel Sessions on Thursday, December 2, 1999

8:00 a.m. - 10:30 a.m.

#### Panel: Adventure Recreation on Public Lands: Dilemmas from a Management and Participant Perspective

#### Stewart Allen, Ph.D.

Social Scientist Division of Refuges U.S. Fish and Wildlife Service 1011 E. Tudor Road Anchorage, AK 99516

Abstract Title: Alaska Residents' Attitudes Toward Limiting Use at Wildlife Viewing Sites

Wildlife viewing sites are among the most regulated recreational settings in Alaska. Visitors are now accustomed to limits and fees at renowned bear viewing sites on the Alaska Peninsula, Admiralty Island, and Kodiak >Island. People have demonstrated their willingness to accept reduced access or increased fees if the result is increased quality of the experience. But what about residents of the state, who have a reputation for opposing limits, regulations, rules, and government controls on their behavior? And what distinguishes people who support limits from those who oppose limits?

These questions were addressed through analysis of data from a multi-agency study of wildlife viewing by Alaska residents documented in a series of reports published in 1994 by the Alaska Department of Fish and Game. A discriminant analysis revealed five variables that predicted whether respondents opposed or favored use limits at wildlife viewing sites: score on a test of environmental knowledge; score on a scale of attitudes toward wildlife and management; level of income; place of residence (urban or rural Alaska); and whether the respondent had taken any wildlife viewing trips during the previous year. Variables such as gender, hunting history, or level of education had less predictive value. Some of the findings had a uniquely Alaskan twist, such as stronger opposition to use limits among people who owned an airplane.

The findings are relevant not only to managing recreational use at Alaska's National Wildlife Refuges and other public lands, but to the general debate on social acceptability of use limits. Strategies for providing information about use limits may benefit from considering the different resident markets for wildlife viewing experiences. Alan Ewert, Ph.D. Professor Patricia and Joel Meier Endowed Chair in Outdoor Leadership Department of Recreation and Park Administration HPER 133 Indiana University Bloomington, IN 47405

Abstract Title: Adventure Recreation: Emerging Issues and Probable Outcomes

Adventure recreation activities continue to grow in both popularity and the potential conflicts. This session looks at a spectrum of issues emerging from participation in these activities, such as, crowding and allowable numbers of users, acceptable levels of risk from a management perspective (e.g., are agencies being successfully sued for accidents), new technologies and their impact on the recreational experience, closures for wildlife and other considerations, and impacts to the resource. The underlying theme of this discussion will be the deliberate inclusion of risk and danger into the recreational setting.

This emphasis on risk-taking behaviors will provide a slightly different "spin" on the discussion than one from a more traditional outdoor recreation perspective. This session will also involve a hands-on approach for some of the technology and audience dialog.

#### Kath Pyke

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#### Sam Davidson

Senior Policy Analyst The Access Fund 2475 Broadway Boulder, CO 80304

The Access Fund is the country's leading non-profit climber education, conservation and advocacy organization. Preserving the opportunity to climb and the diversity of the climbing experience are fundamental to our mission. Working in cooperation with climbers, other recreational users, environmental and conservation organizations, public land managers and private owners, the Access Fund promotes the responsible use and sound management of climbing resources throughout the United States.

The Access Fund encourages an ethic of personal responsibility, self-regulation, strong conservation values and minimum impact practices among climbers.

Relevance of Access Fund to Congress 99 subject matter. Formerly an obscure recreation activity, in the past 20 years, climbing has now become a mainstream recreation activity. An integral part of climbing is its dependence on an unmodified natural environment. As climbing increases in popularity so do the associated impacts on our natural resources. As we end the nineties we are looking at an approach to reduce and manage these impacts on a sustainable and long term basis.

The activity of climbing is a good case study for examining resource capacity issues. This is reflected in current policy issues over wilderness, use fees, fixed anchors and access restrictions for wildlife, cultural and natural resource protection programs. It is also reflected in the recent publications in management journals and articles in Science and Nature in 1999.

Much of the Access Fund's work in our policy and conservation program is concerned with gaining an understanding of what the carrying capacity for climbers is on our natural resources. We support a science-based approach to determining acceptable levels of use and accept the LAC policy as the best way to manage climbing. Our work with public land mangers is collaborative, and based on working partnerships and education outreach.

The success of the cliff nesting raptor wildlife protection program, where over 90 climbing locations on US public lands have seasonal use restrictions, demonstrates that education combined with management intervention does work to protect resources whilst still preserving recreational opportunities.

#### **Rudy Schuster**

Research Assistant Department of Parks, Recreation, and Tourism Management Clemson University Clemson, SC, 29634

#### Dr. James G. Thompson

Professor Department of Agricultural Economics University of Wyoming Laramie, Wyoming

#### Dr. William Hammitt

Professor Department of Parks, Recreation, and Tourism Management Clemson University Abstract Title: Rock Climbers' Attitudes Toward the Management and Use of Bolts

On June 1, 1998, the United States Forest Service (USFS) prohibited the use of fixed anchors for rock climbing in congressionally designated Wilderness areas on National Forests. On August 14, 1998, the USFS rescinded the order and initiated a negotiated rulemaking to clarify the policy. Retraction of the policy was precipitated by a massive outcry of the rock climbing community to a policy that directly managed their sport and limited use of Wilderness Areas. This paper is intended to provide information concerning rock climbers' attitudes toward management of their sport.

Respondents were given an on-site, self-report questionnaire. A total of 452 climbers were approached with the survey, 400 useable surveys were collected from 13 different locations. The sample population was stratified by climbing area. Respondents were asked to identify the type of climbing they participate in; respondents were selfidentified as traditional climbers, sport climbers, and hybrid climbers. The survey included 25 variables that directly addressed management issues associated with the sport of rock climbing.

Using the 25 management variables, factor analysis identified six factors: bolt placement/use, need for management, reservations about management, climbers' responsibility, appropriateness of bolts, and climbers' approach to management. A Repeated Measures Analysis of Variance4 was used to investigate the differences among the six factors based on the types of climbers. Within subjects effects indicated that there are significant mean differences among the six factors, and the interaction of the factors and type of climber is also significant. Pairwise comparisons were used to identify specific differences among the six factors. Between subject effects indicated that there are significant differences in the factors based on type of climber. LSD post hoc tests are used to identify specific significant interaction effects and differences between types of climbers. Management implications will be discussed.

4 Alpha set at .05 for all analysis

**Mike Tranel** 

Denali National Park and Preserve P.O. Box 9 Denali Park, AK 99755

Abstract Title: Accessible Wilderness: A Contradiction in Terms? Determining Appropriate Recreational Access and Capacity in Denali National Park and Preserve, Alaska

Setting limits on access to and recreational use within a national park or other protected area can be challenging. Such is the case in Denali National Park and Preserve, once a very remote, inaccessible place that is now facing a variety of recreational uses that are increasing at an exponential rate.

Denali is an internationally significant protected area and a biosphere reserve under the United Nations Man and the Biosphere program. Wilderness is a fundamental value identified with Denali at its establishment, and opportunities for outstanding wilderness-based recreation are enjoyed by thousands of visitors each year. Unlike many other wilderness areas in Alaska, Denali is accessible by road, and the backcountry is easier to reach than in more remote Alaska parks. A visitor need not venture far into the backcountry to recognize that the park contains large areas with almost no trails and where evidence of human use is minimal to nonexistent.

The original Mount McKinley National Park was established in 1917. It was significantly expanded and renamed Denali National Park and Preserve by the Alaska National Interest Lands Conservation Act of 1980 (ANILCA). The park is currently amending the 1986 General Management Plan to address backcountry management issues that were not covered in previous plans. The new plan will include prescriptions for appropriate access and for the levels and types of recreational activities. These planning goals are especially challenging given language in ANILCA that allows for activities such as motorized uses and subsistence uses that are not normally associated with designated wilderness or the backcountry of a national park.

The new plan will include expanding and updating some successful innovations from the 1970s such as the quota system for overnight use and the concepts of dispersed use and backcountry without trails. Public involvement and support will be essential not only for the planning goals, but for the methods of achieving these goals once the plan is implemented. Success will require working with the public to develop innovative approaches to allocating uses, minimizing conflicting uses, and protecting seemingly remote yet surprisingly accessible backcountry resources.

#### Panel: The Application of Research and Computer Simulation for Managing Complex Use Patterns on Public Lands

#### Paul Box

Assistant Professor Department of Geography Utah State University Logan, UT 84321

Abstract Title: A GIS/ABM-based Evolutionary Algorithm for Determining Recreational Anchorage Carrying Capacity using Subjective Information

With unprecedented demand for access to recreational resources, managers are forced to consider putting limitations on numbers and kinds of uses in recreational areas. One common rationale for determining limits is to find an area's carrying capacity, or the level beyond which it cannot be used sustainably. An objective >calculation of carrying capacity can be difficult in recreational contexts because many of the crucial factors for "quality" recreation are subjective, and can vary widely between individuals and kinds of activities in a given area, factors which do not lend themselves well to traditional analytical solutions. However, given a situation where one knows the individual tolerances and preferences of all of the individuals present in an area, one can rank the suitability of the situation for each of the individuals based on how much their preferences are served and their tolerances violated (how much the aggravate each other). There is a potentially infinite number of combinations of individuals and activities that can coexist within a recreational area, and some combinations are obviously going to be better than others. If an aggravation-based carrying capacity truly exists for a set of concurrent activities, it should be expressed in those combinations that have the greatest number of participants with a minimum of aggravation between them. The author here presents an evolutionary (genetic) algorithm for finding optimal combinations of recreational boat campers for a test anchorage in southwest Florida, that optimize positions, numbers and aggravation levels based on site suitability (environmental factors, determined from GIS data sets) and interpersonal dynamics (estimated from participant surveys), using a combination of agent-based modeling (ABM) and genetic algorithms.

Randy Gimblett, Ph.D. Terry C. Daniel, Ph.D Mike Mitner Susan Cherry Dana Kilbourne School of Renewable Natural Resources University of Arizona Tucson, Arizona 85721

Catherine A. Roberts Michael Ratliff Ryan Bogle Doug Stallman Rob Allred Department of Mathematics and Statistics

Abstract Title: Simulating Rafting the Colorado River through Grand Canyon National Park: A Prototype River Management Tool

The 1989 Colorado River Management Plan (CRMP) established management objectives for experience quality, including the number of river encounters per day, the amount of time in sight of other boaters, the number of encounters at attraction sites, campsite quality and size, trip length, and group size. Monitoring programs conducted from 1989 through 1991 looked at number of river encounters per day, and the number of encounters at attraction sites. In 1995, the National Park Service (NPS) developed a preliminary database-supported model that predicted location of individual trips within specific reaches and at attraction sites. The model illustrated the findings from monitoring data collected earlier. As early as 1980, Grand Canyon identified the potential of a computerized system to evaluate river trip launch schedules that would mitigate impacts to visitor experience including crowding at attraction sites and conflicts at camps. The goal of this paper is to discuss a this effort to develop and test a statistical computer-implemented model for estimating the movement and interactions among river trips. The modeling system employs statistical analyses and mathematical models based on existing river trip itinerary data as well as new data collected from river trip reports from 1998. The Grand Canyon River Trip Model combines intelligent agent modeling with Geographic Information Systems (GIS) in an interactive system which provides the manager with advanced visualization of individual trip progress, as well as interactions among trips during specified time periods. Locational information includes specified river reaches, camps and attraction sites, exchange points, and restricted areas. The goal of this model system is to provide NPS managers (and other potential users) with an effective

decision support tool for representing and evaluating the distribution and volume of use along the river. The river trip simulation system, model validation and management implications will be discussed.

#### **Troy Hall**

Associate Professor Virginina Tech Forestry

Abstract Title: Evaluating Social Conditions on the Colorado River in the Grand Canyon: Effects on Experiences and Changes Over Time

This study used observational and survey data to describe and understand encounters among groups of boaters on the Colorado River in Grand Canyon. This research complements modeling research on trip movement and interaction patterns, by providing data on boaters' perception and assessment of the encounters they have. Observers traveling with commercial and private trips documented the location, duration, and number of encounters with all other parties on the river. At the end of each trip, boaters were asked to fill out a questionnaire, indicating how many encounters they had, their perception of crowding, and the effect of encounters on various experience dimensions. Boaters reported that, on the busiest day, they encountered an average of 4-6 other groups. There were significant differences between commercial motor, commercial oar, and private boaters in perceptions of crowding -- with motor passengers least sensitive and private boaters most sensitive. In general, encounter levels on the river were not so high as to interfere with commercial passengers' experiences, although they were too high for many private boaters. Encounter levels at attraction sites detracted more than encounters on the river for all groups of boaters. Despite increases in the total number of boaters over the past 25 years, perceptions of crowding and number of encounters have not increased dramatically.

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Abstract Title: Evaluating and Simulating the Spatial Distribution of Recreation Use in the John Muir and Ansel Adams Wilderness Areas

This paper will discuss a project currently underway to capture base line information on the spatial and temporal distribution of wilderness recreation use in the John Muir and Ansel Adams wilderness areas on the Inyo and Sierra National Forests. This study has been conceived based on increasing pressures from recreational use from noncommercial and commercial users of the Inyo and Sierra National Forest. Given the complexity of social and environmental interactions, wilderness management is in need of base line data of both the recreation use and a set of tools that provide insight into the cause and effect relationships between management actions and social and environmental outcomes. These tools exist for the management of economic resources such as forest productivity, water quality and quantity and mineral resources. However the theoretical and methodological approaches for modeling the interactions between social and environmental impacts is primitive by comparison. The goal of the first phase of this project is to provide forest managers with information that can assist them in understanding the spatial distribution (where, when and why) of both private and commercial recreation use of the mentioned wilderness areas. This will be followed by the development of an effective decision support tool for representing and evaluating alternative packstock trips/permitted backcountry use and various scheduling scenarios. The approach, initial results and future modeling work and management implications will be discussed in this presentation.

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**Environmental Systems** 

Abstract Title: RBSim II: Using GIS-Agent Simulations of Recreation Behavior to Evaluate Management Scenarios in Port Campbell National Park and Bay of Island National Park Victoria, Australia

This paper describes advancements in recreation management using new technology that couples Geographic Information Systems with Intelligent Autonomous Agents to simulate recreation behavior in real world settings. RBSim II is a computer program that allows park management to explore the consequences of change to any one or more variables so that the goal of accommodating increasing visitor use is achieved while maintaining the quality of visitor experience. RBSim II provides both a qualitative understanding of management scenarios by the use of map graphics from a GIS as well as a quantitative understanding of management consequences by generating statistics during the simulation. Managers will are able to identify points of over crowding, bottle necks in circulation systems, and conflicts between different user groups. RBSim II is designed to be easy to use by Parks Victoria staff. This is facilitated through a tight integration with MapInfo GIS which allows a practical solution for quickly building complex simulation models. Simulation techniques provide methods for evaluating details of management decisions as they impact visitors and the environment. Innovations include the use of network topology to represent road and trail systems, Analytical Hierarchy Process to rate the attractiveness of site features and generate recreational personality types, and object oriented database management techniques to allow portability of RBSim to any other Park or recreation setting.

The paper describes RBSim II and its application to simulating and evaluating alternative park management scenarios in Port Campbell National Park and Bay of Islands Coastal Park in Victoria, Australia

\*Presenter and primary contact person

#### Linda Jalbert

Grand Canyon National Park National Park Service

Abstract Title: Grand Canyon River Management: Balancing Use, Preserving Wilderness Values, and Establishing the Need for Research

In 1979, the National Park Service approved a Colorado River Management Plan based on the Grand Canyon Wilderness Recommendation and findings from a comprehensive research program. An amendment to an Interior Appropriations Bill in 1981 prohibited the implementation of this plan and resulted in increased use levels and continued motorized use in proposed wilderness. In the last 20 years, the demand for whitewater experiences has increased, especially for the self-outfitted public. Today, the NPS is being challenged by users and preservationists to provide access and maintain wilderness integrity.

For the past decade, recreational use of the Colorado River has remained relatively constant with 20.000 to 22,000 visitors. In addition, the Park hosts an array of river-based research projects, a large portion of which is related to Glen Canvon Dam operations. Most of the recreational use is concentrated in the summer months, resulting in high encounter rates and congestion at riverside attraction sites. Commercially guided operations account for over 80% of the total recreational use, of which 85% is on motorized rafts. The remaining proportion of recreational river trips are conducted by noncommercial, self-outfitted public. Nearly 60% of the self-outfitted trips occur in the summer months, with an even proportion on use in the spring and fall. Less than 1% of these trips are motorized. In connection with the Park's first Wilderness Management Plan (Draft, 1998), the agency is revisiting public and agency concerns about wilderness management. The obvious question is how established motorized use fits into the wilderness management concept. Related and significant issues such as group size, length of stay, and resource preservation are being also being addressed within the wilderness management framework. One of the greatest challenges being met by the Park Service is the fact that

wilderness policy and management practices have been disregarded in the last 20 years.

The renewed public interest in wilderness river management, along with more rigorous attention to agency wilderness policy, has guided the Park Service towards the development of a comprehensive approach to visitor use planning for the proposed wilderness, and specifically the Colorado River. In 1998, the Park Service contracted with four universities on two visitor use studies. The first, is a development of computerized model that simulates river traffic along the Colorado River. This tool will enable to the Park to evaluate alternative river launch scenarios that directly related to management objectives for river management. The indicators and standards for those management objectives will be derived in part, through a study that replicates visitor preferences and perception of their river trip experiences. This study is a replication of the research done in 1976 for the first Colorado River Management Plan (1979). In addition, a survey is being conducted that examines the visitor perceptions of values affected by dam-operated river flows. This last study, while not conducted by the Park Service, is part of the ongoing Glen Canyon dam research and monitoring program.

The Park Service managers believe that the current research has made a significant contribution to the existing information base. It is hoped that Park managers will apply the findings of these visitor studies in such a way that reflects public opinion, and is within the framework provided by law, policy, and the purpose and significance of Grand Canyon National Park.

#### Panel: From Loons to 'Toons: Comparisons in Visitor Capacity Management Strategies From National Parks to Theme Parks

Al Shacklett ORCA Consulting

Abstract Title: Comparison of Carrying Capacity Approaches

As a consultant to both public and private sector clients, Mr. Shacklett has had the opportunity to help develop and support a variety of approaches for establishing carrying capacities.

This presentation will provide a comparison of the similarities and differences in these approaches, using several public and private sector projects as case studies, including the Grand Canyon and Yosemite national parks and the Walt Disney and Universal theme parks. Another key planning issue that is often overlooked in carrying capacity discussions is the fact that, by establishing a capacity for a given site, all visitor resources and support facilities for that site are impacted (e.g.: scenic areas, roads & parking, food service & retail, paths & trails, rest rooms, etc.). This presentation will provide an overview of an integrated planning approach that has been developed to ensure that all visitor resources and support facilities are effectively planned to meet the established carrying capacity.

#### Panel: FERC Licensing

#### Lisa Grise

Recreation Resource Analyst Idaho Power Company Boise, Idaho

Abstract Title: The Collaborative Aspects of Conducting Recreation Studies for the FERC Relicensing Process

Idaho Power operates 17 hydroelectric projects under licenses issued by the Federal Energy Regulatory Commission. Of Idaho Power's 17 projects, eight licenses will expire by 2010, including the Hells Canyon Complex, the company's largest hydroelectric source. Idaho Power has been consulting with stakeholders in relicensing efforts for more than a decade. However, anticipating an increased level of interest in the Hells Canyon facilities, Idaho Power joined with agencies, tribes, non-governmental organizations and other state and local entities to develop a formal collaborative process. The goal of the process was to identify concerns of various stakeholders early in the relicensing process so that issues could be evaluated effectively and balanced with other interests.

As a result, two types of groups were formed: 1) *the Collaborative team* represents all concerned stakeholders and the broad range of interests and values to be considered, and 2) *Resource Work Groups* were formed to consider the technical aspects of relicensing including review of issues, formulating study plans and development of protection, mitigation and enhancement proposals.

As a result of the collaborative process, the Recreation Resource Work Group initially developed 13 study plans including studies to evaluate recreational use, visitor opinions and attitudes, carrying capacity, and affects of river flows and water level changes. Some of these studies have been underway since 1994 and will continue through 2000. The Recreation Work Group currently meets every second or third month to review study progress and make recommendations.

The Hells Canyon collaborative process has spawned many successes and learning opportunities over the last several years. The main success has been improved communication and understanding of a diverse array of viewpoints. One of the downsides has been the lack of steady commitment from participants. A learning opportunity has been in wrestling with who's responsible, licensee or managing agency, for resource changes over time, commonly referred to as "induced use." A major question we continue to dwell on throughout this process...Is relicensing becoming the panacea for dwindling federal dollars to manage public resources?

#### Kirby Gilbert

Geographer and Program Manager Foster Wheeler Environmental Corporation

Abstract Title: Experiences in Reaching Consensus on Recreation Resource Management and Protection of Natural Resources

Over the last three decades the types and mix of recreation activities American's are participating in has changed considerably from what it was 30 years ago. People continue to seek out new sources of outdoor enjoyment and activities. The root of these changes stems from many factors but include factors such as:

- the trend toward larger concentrations of the population residing in urban/suburban environments;
- improvements in the technology and availability of outdoor recreation equipment;
- need for more challenging experiences and changing social and cultural needs and desires; and
- improved mobility of individuals.

At the same time numerous federal, state, local agencies, and non-governmental organizations, which include recreation user groups have exerted increasing influence on resource management policies. Rivers, lakes, and mountain recreation settings continue to experience significant changes in recreation use patterns, activity mixes, use levels and management requirements. The people that are engaging in recreation along with resource managers and commercial interests are continually raising more issues about the adequacy of the supply of recreation settings and facilities along with the adequacy of up-to-date management policies. At the same time a new and inclusive process for how these changes fit into a program of responsible resource management with adequate protection of the environment becomes very relevant. Resource managers must balance the new needs of the recreating public with natural resource management requirements and other users of the land and water. Resource managers are continuing to be asked to work more closely with the various stakeholders so they buy into a decision process that leads to a new and successful management program.

Many of the issues confronting resource managers today focus on how to create a successful framework or process that brings stakeholders into a common forum so they can have meaningful input into future management of the resource. Both the recent Federal Energy Regulatory Commission relicensing of the Platte River Projects and the Corps of Engineers' study of the potential for removal of four dams on the lower Snake River are examples of processes that provide some insight into how stakeholders have and have not been brought into the recreation study process. These insights help to provide further insight into how a better process might be created. From these examples and other recent projects I will present common themes for a structure of how collaboration can be successful to reach consensus for recreation development and management in natural resource settings.

#### **Thomas Wegge**

**TCW Economics** 

Abstract Title: Determining Project-Induced Recreation Effects: A Case Study of Project 184 in the Eldorado National Forest

The Forest Service has the authority, under Section 4(e) of the Federal Power Act, to include conditions for the operation of hydroelectric facilities located on National Forest System lands. The Forest Service has implemented this authority through relicensing, a process that takes 5 years to complete. One of the preliminary steps in the relicensing process is to identify studies that are necessary to determine appropriate license conditions. One of the Forest Service's major objectives of relicensing studies is to develop information that can be used to assign responsibility to the licensee for project-induced recreation effects. Identifying project-induced effects of hydroelectric facilities that have been in operation for many years presents some

key analytical challenges, one of which is establishing a preproject baseline condition to measure post-project changes against. We present preliminary results of studies to determine the project-induced recreation effects of Project 184, a hydroelectric generating facility located in California's Eldorado National Forest that is currently undergoing relicensing. The methods used to establish a pre-project baseline condition and to identify projectinduced recreation changes are described. Special focus is on the data and assumptions needed to implement this approach.

#### Panel: Innovative Solutions to Solving Motorized Recreation and Resource Capacity Issues: Real Solutions!

## **Dennis Buechler**

Colorado Wildlife Federation

Colorado Wildlife Federation has a long-standing concern about the impact of off-road vehicles (ORVs) on the wildlife resource, its habitat, and recreation associated with wildlife. Responding to our members' concerns, the Board passed a resolution three years ago that articulated guidelines for proper ORV usage during hunting seasons. CWF launched its campaign this year on the use of ORVs on public land and offers some specific proposals to serve as framework upon which to build solutions together with motorized user groups, wildlife recreationists and land management agencies. For purposes of this panel discussion, our presentation will focus on ORV use in the context of hunting seasons. CWF proposals include adoption of timing restrictions on ORV use in hunting areas during hunting seasons; establishing seasonal restrictions in wildlife breeding or birthing areas, as needed; and increasing penalties for repeat infractions coupled with a toll-free number to report violations. Another proposal is to review regulations on spotlighting and hazing of wildlife to ensure adequate communication and enforcement when ORVs are involved. In addition, CWF advocates the issuance of a "green sticker" as a component of the registration process which would require funds to be used to improve habitat, trails and law enforcement. Finally, it is necessary to encourage self-policing by user groups through volunteer programs, educational information, and partnerships. As attendees can see from this summary, CWF focuses on management for healthy wildlife populations and habitats, not user conflicts. Examples of on-the-ground success stories will be incorporated into CWF's presentation.

**Clark Collins** 

BlueRibbon Coalition 1540 North Arthur Pocatello, ID 83204

Abstract Title: Wilderness is Not Good for Recreation: Back Country Recreation Area (BCRA) Designation is Needed

Many U.S. citizens do not trust our federal land managers to manage our natural resources responsibly. Wilderness advocates have taken advantage of this situation to promote Wilderness designation as a means to protect these areas. Wilderness designation was originally conceived, by the Wilderness advocates involved in the passage of the 1964 Wilderness Act, as appropriate for about ten million acres of administratively designated Wilderness and Primitive Areas. Present day Wilderness advocates have since "corrupted" the concept to a system of over one hundred million acres and they say we need much more.

An alternative land designation should be considered to help resolve the Wilderness debate on our federal lands, which are located primarily in the West. Currently there is also an effort by Congress and the Clinton Administration to purchase large green belts in the Eastern United States where there is little federal land. Without an alternative, these green belts will mostly likely also be set aside as defacto wilderness areas.

WHO WOULD BE AFFECTED: Off highway motorcycles, snowmobiles, 4X4s, mountain bikes, ATVs, and personal watercraft are not allowed in designated Wilderness. Horseback riders, hunters and other nonmotorized recreationists are also increasingly under attack from Wilderness advocates who push more restrictive regulations in existing Wilderness areas and those areas proposed for that designation.

WHAT SHOULD BE DONE: The U.S. Congress should consider legislation establishing a federal designation that is less restrictive to recreational use than Wilderness. This designation should be designed to protect and if possible enhance the back country recreation opportunities on these lands while still allowing responsible utilization of these areas by the natural resource industries.

WHERE: This designation should be considered for those areas currently identified by the federal land management agencies as "roadless" and thus currently under consideration for Wilderness designation. Areas considered may or may not be recommended for Wilderness designation or classed as Wilderness Study Areas. WHEN: All "roadless" federal lands, not currently designated as Wilderness, should be reviewed for their importance to back country recreationists and considered for designation as BCRAs within 20 years of the passage of this act.

WHY: Many roadless areas have been under consideration for Wilderness designation for over 30 years. Much of the opposition to Wilderness designation in many of these areas has been from recreationists whose preferred form of recreation isn't allowed in Wilderness areas. Recreational resources need not be sacrificed for responsible resource use. We need a designation that encourages cooperation, not only between diverse recreation interests, but between recreationists and our resource industries. The BCRA can be that designation.

#### Les Weeks OHMVR

California

Abstract Title: Balancing Recreational Opportunity and Resource Protection

Oceano Dunes State Vehicular Recreation Area (SVRA) offers many unique opportunities for outdoor recreation not found elsewhere in California. The over onemillion visitors who use this State Park annually enjoy a variety of recreational activities. Groups of friends and families consisting of the young, the old, the physically disabled enjoy the Oceano Dunes SVRA because of its unique significant vehicle access not available at any other of California's beaches.

Oceano Dunes SVRA has been recognized as an ecological gem that supports diverse and abundant plant and animal species and their habitats, including numerous Federally and State listed species. Because of this park's multiple recreational uses and its sensitive ecological setting, it is carefully managed by the Off-Highway Motor Vehicle Recreation Division (OHMVRD) of the California Department of Parks and Recreation (DPR). Through the analysis of data collected via a number of programs that carefully monitor social and environmental carrying capacity factors, Park staff has been able to engage in adaptive management protocols that have ensured that recreational uses and resource protection can coexist.

# Panel: ROS - Recreational Opportunity Spectrum

#### Jim Simonson

Forest Recreation and Wilderness Program Manager

#### Meg Lindsey

Recreation Topic Leader for Forest Plan Revision

Abstract Title: Forest Recreation and Wilderness Program Manager and Recreation Topic Leader for Forest Plan Revision

The question of how much public use can be accommodated on the White River National Forest has been asked during its current Forest Plan revision effort. In an attempt to answer this question, a broad scale recreation carrying capacity analysis using a Geographic Information system (GIS) has been underway as part of the revision process. Thus far, Forest planning is proving to be a good platform to begin determining capacities since desired future ecological, physical, and social conditions are analyzed, documented, and publicly reviewed during this process.

Various summer and winter Recreation Opportunity Spectrum classes and travel management strategies, which affect capacity, have been analyzed under different management alternatives. These assessments and inventories are part of the forest's GIS database. An Arc Macro Language (AML) was written, incorporating the GIS data, to calculate Forest wide carrying capacities. Limits of acceptable change in the form of maximum use guidelines have been proposed as well.

It has been a recognized that the capacities produced are at a macro scale, and site-specific ecological, physical, and social constraints have not been applied. After the Forest Plan has been revised, site specific data will be collected. At that time efforts will be focused on refining the GIS approach to generate site-specific capacity estimates.

This paper details methods and use coefficients tested to calculate recreation carrying capacity on a Forest wide basis. Also discussed is the usefulness of Forest-wide capacities for resource planning purposes.

#### **Panel: Community Tourism Impacts**

Angela West Bureau of Land Management

Joyce Fierro Bureau of Land Management William Overbaugh Bureau of Land Management

Abstract Title: Our Common Ground: Economic, Social and Environmental Impacts of Tourism Within Protected Areas Along the U.S./Mexico Border States Region

Our Common Ground is a bilingual publication that describes many of the benefits derived from outdoor recreation based opportunities and the contribution they make to a sustainable quality of life throughout Our Common Ground - the Mexico/U.S. border states. Also described are some of the costs that can accrue from thoughtless use of our outdoor assets, including limited carrying capacity/management issues unique to a bicultural, international border region. The direct and indirect economic impacts and values of protected areas and outdoor recreation related tourism will be presented. The biological and social implications will be discussed as they are inevitably linked to economic benefits and costs. The regional trends, outdoor assets, recreation demand, customer profiles and future strategies will be explored. Information is derived from existing and readily available data and research for the national, regional and local levels. Trend discussions summarize user preferences, projected demand, limited supply, and projected deterioration of outdoor assets. Two international (U.S. Mexico & U.S./Ecuador) tourism/protected area, collaborative projects led by BLM New Mexico, will be sighted as examples of positive solutions to carrying capacity issues. Both projects involve sustainable concepts applied to regional issues, by indigenous populations within the U.S., Mexico and Ecuador.

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